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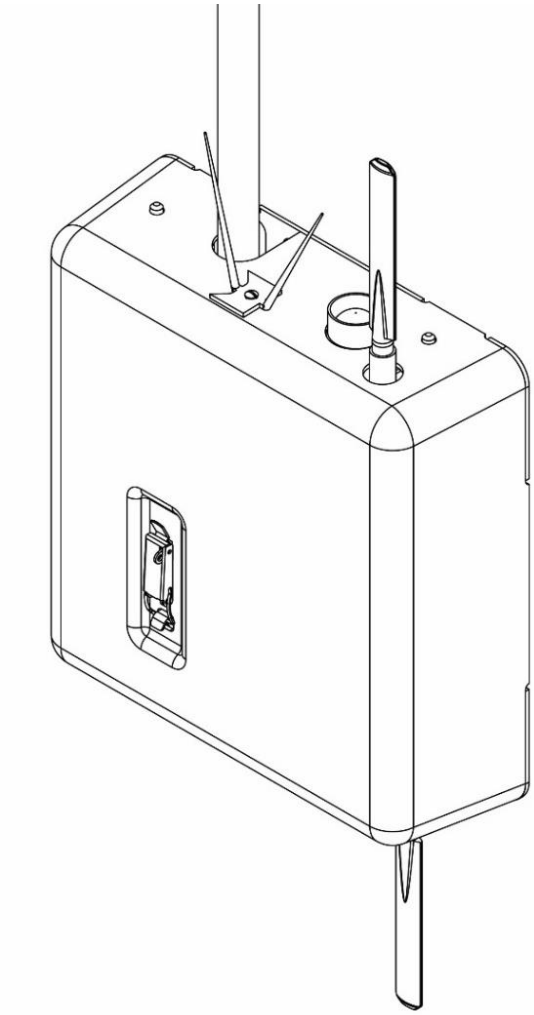
Basestation 4 Product & Installation Manual (Model B4)



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Notices

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Table of Contents

1 Introduction

1.1 Overview

This manual covers the installation, test and commissioning guidelines for the Telensa Basestation 4 or B4 (herein referred to as the Basestation).

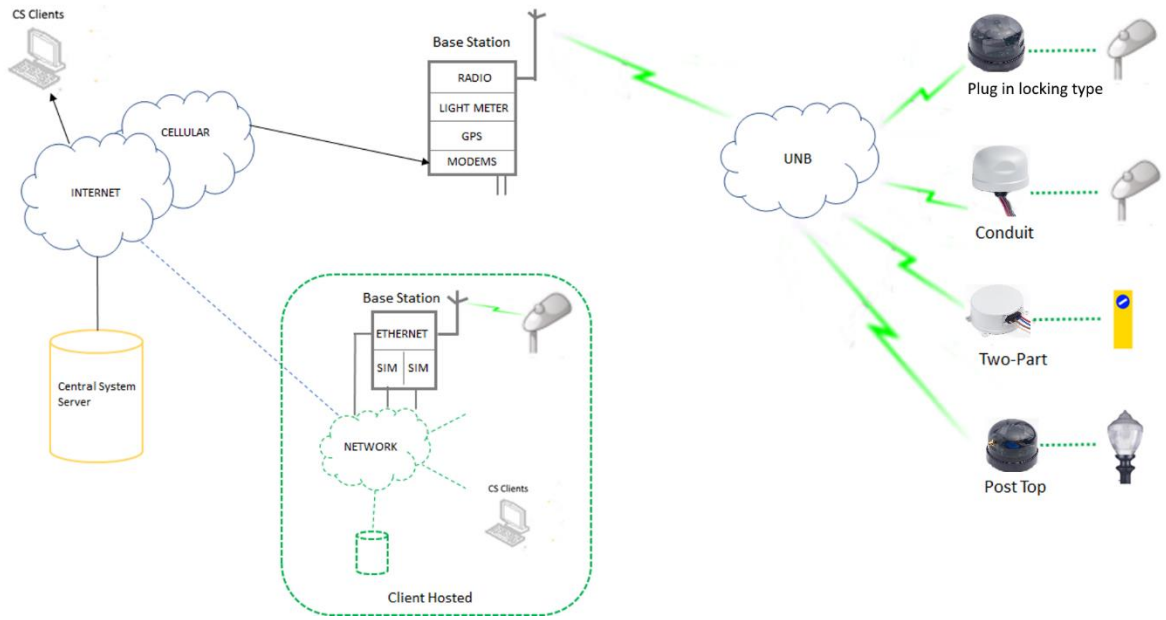
A network comprises of a Central System Server, Basestations and Telecells.

The BS4 Basestation is a newer model than the BS3 Basestation, but both can co-exist in the same deployment. The Basestation is installed either at the top of a column or alternatively on a building rooftop. It provides radio coverage over several a radius of several miles, to Telecells that are fitted to each streetlight. A single Basestation can connect up to 5,000 Telecell units, although for optimal performance, a planning quantity of 3,500 Telecell units per Basestation is used.

The Basestation contains the Ultra Narrow-Band (UNB) radio, a host processor and two wireless modems for connectivity back to the Central System Server. If a suitable cellular backhaul service is not available (e.g. 4G or 3G) then Ethernet can be used for backhaul.

It has an internal light meter which is used to measure ambient light at dawn and dusk; the light level readings are used when the lamps are programmed to switch according to measured light levels.

The Basestation is supplied as a main unit with a solar shield. Suitable mounting brackets are available for wooden or metal poles. The bracket is mounted first, followed by the main unit and finally the solar shield. Mains power is required to power the Basestation. Refer to Section 4: Installation Procedure and Requirements for further details.



PLANet System Architecture Overview

1.2 General Warnings and Electrical Safety

This section provides safety and regulatory warnings, cautions and information for the Basestation and its internal components. Details of manufacturer's source documents are noted where they are used.

Installers must be suitably trained and qualified for electrical work, according to the laws and local codes for the locality and country where the unit will be installed. This unit must only be installed by personnel that have been trained by Telensa or their representatives to carry out this work.

The supply voltage present in the Basestation is hazardous and all necessary precautions must be taken to ensure the safety of the installer and maintenance staff. Isolate the supply to the unit before opening the power supply compartment (left-hand side).

⚠ The Basestation MUST be fitted with a suitable disconnect device, meeting local wiring regulations, to isolate the base station from the mains power

⚠ This product MUST be earthed

⚠ CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

⚠ ATTENTION: Double pôle/fusible sur le neutre. Débrancher l'alimentation avant l'entretien.

⚠ The correct fusing strategy must be used depending on the local supply configuration and wiring regulations. This may necessitate the need for double pole fusing if appropriate although this may be not recommended in certain situations.

⚠ Supply connections MUST be made water and weatherproof against the weather conditions encountered at the installation location

⚠ Connection to mains power must comply with the requirements of the electrical code for the country of use

⚠ A suitable mains cable must be used to connect the Basestation to the electrical supply:

- Outer cable diameter (including insulation): 7 to 13mm
- Minimum conductor size: 0.75mm^2 (or AWG 18)
- Copper conductors only

⚠ The Basestation uses a NiMH battery pack to maintain operation during short term power loss. Only replace this battery pack with one supplied by Telensa.

1.3 Regulatory Statements and Compliance Information

1.3.1 United States of America

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. Installers and end users must follow the specific installation and operating instructions for satisfying RF exposure compliance. The antenna used with this Basestation must be maintained at least 22.5cm from any person when the equipment is operating.

Transmit frequency range: 902.0 to 928.0 MHz

Maximum transmit power: 36 dBm (4W) EiRP

1.3.2 Safety UL/CSA 62368

The Basestation shall be installed exclusively on a lighting pole, metal or wooden, per NEC art. 400.10(A)(2).

1.3.3 UL 50E: Basestation Environmental Enclosure Declaration

The Basestation is declared as a 4X enclosure as defined in Section 10 Table 1: “Comparison of specific applications of enclosures for indoor and outdoor non-hazardous locations” within the UL50 standard “Enclosures for Electrical Equipment, Environmental Considerations”.

1.3.4 Canada

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

1) this device may not cause interference, and

2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le dispositif est conforme au standard RSS d'exemption de licence définie par Industry Canada. L'utilisation de ce dispositif est assujettie aux deux conditions suivantes :

(1) ce dispositif ne doit pas causer d'interférences et

(2) ce dispositif doit accepter toutes les interférences, y compris celles qui pourraient provoquer un fonctionnement non souhaitable de l'appareil.

This radio transmitter (12199A-TBSA1), has been approved by ISED Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna Type	Gain (dBi)
1SKP-794-8DB-915-PLEX Heavy Duty Co-Linear Dipole Antenna	+8

L'émetteur radio (12199A-TBSA1) a été approuvé par ISED Canada pour fonctionner avec les types d'antenne listés ci-dessous et cela pour les gains maximum admis également mentionnés. Tout autre type d'antenne non inclus dans cette liste, ayant un gain supérieur au gain maximum toléré, est formellement interdit d'utilisation avec le dispositif pre-cité.

Antenna Type	Gain (dBi)
1SKP-794-8DB-915-PLEX Heavy Duty Co-Linear Dipole Antenna	+8

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment.

Installers and end users must follow the specific installation and operating instructions for satisfying RF exposure compliance.

The antenna used with this Basestation must be maintained at least 33cm from any person when the equipment is operating.

Cet équipement est conforme aux limites d'exposition aux rayonnements d'ISDE établies pour un environnement non contrôlé.

Les installateurs et les utilisateurs finaux doivent suivre les instructions d'installation et d'utilisation spécifiques pour satisfaire à la conformité de l'exposition aux RF.

L'antenne utilisée avec cette station de base doit être maintenue à au moins 33 cm de toute personne lorsque l'équipement fonctionne.

1.3.5 Europe

Manufacturer: Telensa Ltd

Iconix 3, London Road, Pampisford, Cambridge, CB22 3EG, United Kingdom

EU Authorised Rep: Signify Netherlands BV

High Tech Campus 48
5656 AE Eindhoven
The Netherlands

Table 1: Basestation Operating Frequencies (European Variant)

Frequency Band (MHz)	Transmit Power (W)
869.40 – 869.650	0.5
1920 – 1980	0.2 (4G), 0.25 (3G)
1710 – 1785	0.2 (4G), 0.25 (3G), 1 (2G)
2500 – 2570	0.2 (4G)
880 – 915	0.2 (4G), 0.25 (3G), 2 (2G)
832 – 862	0.2 (4G)
703 - 733	0.2 (4G)

1.4 Related Information

3GPP TS 36.101	Evolved Universal Terrestrial Radio Access (E-UTRA)
[TL-000762-ST]	System Glossary
[TL-005536-PR]	System Overview Manual
[TL-006842-MC]	Network - Current Public Data Sheet (Basestation 4 Data Sheet)

1.5 Abbreviations

BS4	Basestation 4
UNB	Ultra NarrowBand
GPS	Global Positioning System
NiMH	Nickel Metal Hydride Battery
FCC	Federal Communications Commission
ETSI	European Telecommunications Standards Institute
EiRP	Effective Isotropic Radiated Power
ERP	Effective Radiated Power
RF	Radio Frequency
RSS	Radio Standards Specification
ISED	Innovation, Science and Economic Development Canada
IP66	Protected from total dust ingress. Protected from high pressure water jets from any direction, limited ingress protection
GNSS	Global Navigation Satellite System
NTP	Network Time Protocol
SIM	Subscriber Identity Module
PCB	Printed Circuit Board
LED	Light-Emitting Diode
Nm	Newton Metres
PVC	Polyvinyl Chloride
AWG	American Wire Gauge
UV	Ultraviolet
VPN	Virtual Private Network
PicoZed™	A highly flexible, rugged, System-On-Module
PSU	Power Supply Unit
FPGA	Field-Programmable Gate Array

2 Basestation Characteristics

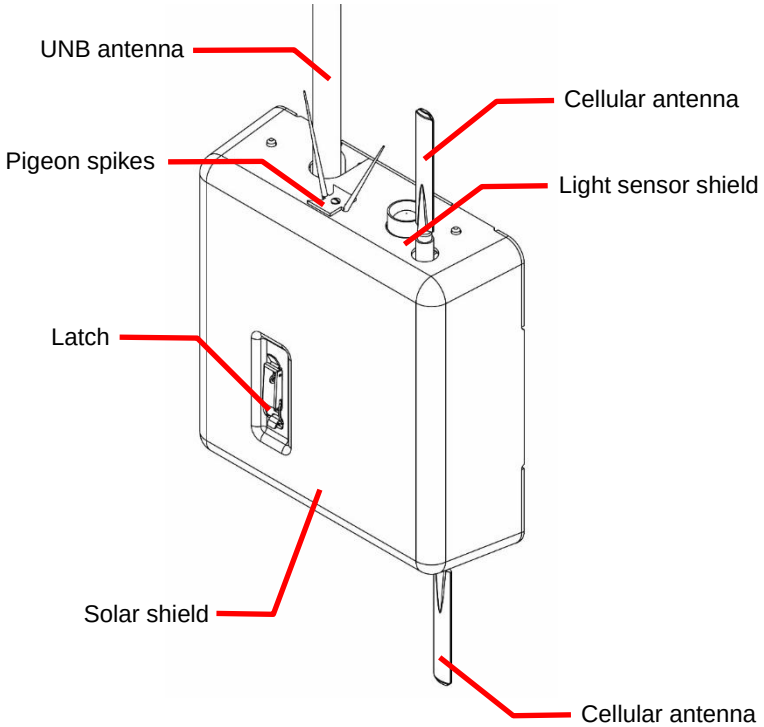
2.1 Basestation Features

Basestations provide the interface between the Telecell and the server. The Basestation utilises Ultra NarrowBand (UNB) radio to communicate to the Telecells and, either Ethernet or the cellular network, to connect to the server.

The Basestation principally comprises of:

- An integrated mains power supply and a power inlet board with additional surge protection
- A processor board (“PicoZed”)
- A main board which includes the UNB radio (regional variants)
- A cellular backhaul a board (regional variants) which includes two cellular modems. These are often fitted with SIMs for two service providers, so the basestation can switch if one service fails.
- An Ethernet port, as an alternative to cellular backhaul
- An integrated GPS receiver and light meter, used to monitor location, time and local light levels, to control streetlights accordingly
- A backup battery, to overcome short mains power outages and allow a controlled shut-down during longer outages. Replacement recommended every 4 years
- Antennas for the UNB radio and cellular backhaul.
- A mounting bracket (variants for different pole types), and a solar shield
- Externally visible status LEDs

2.2 Basestation Components



2.3 Radio

Protocol	UNB
Supported Bands	International: 902 - 928MHz with regional variations EU: 868.0 – 869.6MHz
UNB Receiver Sensitivity (Minimum)	-139 dBm conducted
Transmit Power	US: 4W EIRP EU: 500mW ERP (maximum) Others: Contact Telensa for details

2.4 Electrical Characteristics

Voltage	100–240V nominal 50-60Hz
Current	0.5A max
External Fusing Requirements	6A fuse recommended – single or double pole fusing may be required depending on the local wiring regulations
Consumption	15W (30W max with heater on)
Surge protection	Tested to ANSI C136.10 (20kV/10kA)

2.5 Operational Characteristics

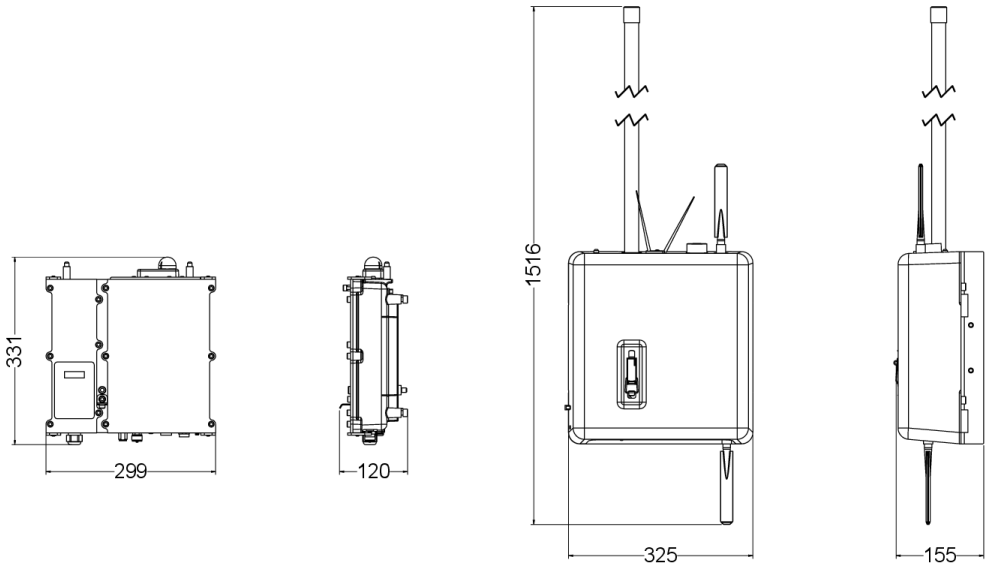
Environmental Rating	IP66
Operating Temperature	-40°C to +60°C / -40°F to +140°F

2.6 Capacity

Max Number of Supported Telecells	Up to 5000

2.7 Physical

Connections	Ethernet (optional), power
Main Basestation Unit Dimensions (Excluding Antennas and Bracketry)	331 x 299 x 120mm / 13 x 11¾ x 4¾"
Overall Basestation Dimensions (Including Antennas and Bracketry)	1516 x 325 x 155mm / 59¾ x 12¾ x 6⅛"
UNB Antenna Length	1310mm / 51⅝"
Mounting Options	Direct pole mount or sign strapping



2.8 Weights

Main Basestation unit (excluding antennas)	5.0kg
UNB antenna	0.65kg
Cellular antennas	2 x 0.05kg
Mounting plate	0.85kg
Solar Shield	0.55kg
Main unit with antennas	5.7kg (12.5lb)
Main unit with antennas, solar shield and mounting plate	7.1kg (15.7lb)

2.9 Global Positioning

GPS as standard Contact Telensa for more GNSS options

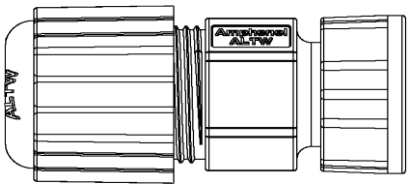
2.10 Connectivity

Backhaul	2x 4G/3G cellular and Ethernet (optional)
Bands	Contact Telensa for details

Basestation Ethernet Port

Amphenol RCP-5SPFFH-SCM7001

Suitable Ethernet Connector



Amphenol RCP-00BMMS-SLM7001

2.11 Environmental Protection

Heater	As standard
Solar Shield	As standard
Marine Resistance	Salt spray EN60950-22

2.12 Time Monitoring

GPS as standard NTP

2.13 SIM Selection

When selecting SIMs for Basestation 4, ensure that the chosen operator only requires use of the supported bands for the modem/antenna combination. This information is available from the operator.

Please liaise with Telensa sales/support when first selecting or changing operator to confirm that they are suitable and that their APN is configured.

3 Product Codes

For Basestation product codes, the middle letter designates the region, and the last letter designates wooden pole-mount fittings or strap-mount fittings.

e.g. **B4-E-1B** = ETSI variant with wooden pole-mount kit

Region (typical)	**Mounting Kit**
A / B – North America (FCC) E – Europe (ETSI) L – Latin America S – Asia Z - Australia/New Zealand	A – Wooden Pole-Mount B – Strap-Mount

The product codes below are correct at time of publication, new ones will be added as they become available. Please consult with Telensa for any updates to the below.

Product Code	**Description**
B4-A-1A	Basestation (FCC variant) with Wooden Pole-Mount Fittings
B4-A-1B	Basestation (FCC variant) with Strap-Mount Fittings
B4-B-1A	Basestation (FCC variant supporting cellular band 26) with Wooden Pole-Mount Fittings
B4-B-1B	Basestation (FCC variant supporting cellular band 26) with Strap-Mount Fittings
B4-E-1A	Basestation (ETSI variant) with Wooden Pole-Mount Fittings
B4-E-1B	Basestation (ETSI variant) with Strap-Mount Fittings
B4-L-1A	Basestation (Latin American variant) with Wooden Pole-Mount Fittings
B4-L-1B	Basestation (Latin American variant) with Strap-Mount Fittings
B4-S-1A	Basestation (S-variant) with Wooden Pole-Mount Fittings
B4-S-1B	Basestation (S-variant) with Strap-Mount Fittings
B4-Z-1A	Basestation (Z variant for Australia/New Zealand) with Wooden Pole-Mount Fittings

B4-Z-1B	Basestation (Z variant for Australia/New Zealand) with Strap-Mount Fittings
B4-TOOLKIT-S	Basestation 4 Installation Toolkit
B4-ANT-E	Replacement UNB Antenna (ETSI Variant)
B4-ANT-F	Replacement UNB Antenna (Other Variants)
(Contact Telensa)	Replacement Cellular Antennas
(Contact Telensa)	Battery Replacement Kit

4 Installation Procedure and Requirements

4.1 Pre-Installation Conformity

The Basestation should be installed on a pre-selected and certified column/pole, chosen in direct accordance with the Frequency Plan, local area constraints and column/pole weight loading suitability (agreed between the customer and Telensa Operations team in advance of the installation).

The most suitable columns/poles for the Basestation deployment purposes are 7m or taller, straight with horizontal bars, or a dedicated column/pole installed for the purpose. In exceptional cases, a 6m column/pole may be utilised.

The following types of street lights may require additional installation equipment (such as additional brackets):

1. Short columns (below 7m tall)
2. Wooden columns
3. Hexagonal columns
4. Heritage street lights
5. Swan neck street lights

In these instances, consult the Telensa Operations team before proceeding with the installation.

The mounting plate should be positioned as high as possible, opposite to light fixture / avoiding light pollution, avoiding overhead cables, and ideally away from trees/foliage and buildings.

ALERT: The light meter should be positioned to avoid **light pollution** from surrounding lamps

4.2 Pre-Provisioning (Strap-Mount Only)

The lighting contractor is to prepare the column/pole by drilling a Ø20mm hole, running the mains cable through the column to an independent isolator or 6A fuse in the base of the column. Fusing may be required to be single or double pole depending on the local wiring regulations.

4.3 Installation Equipment

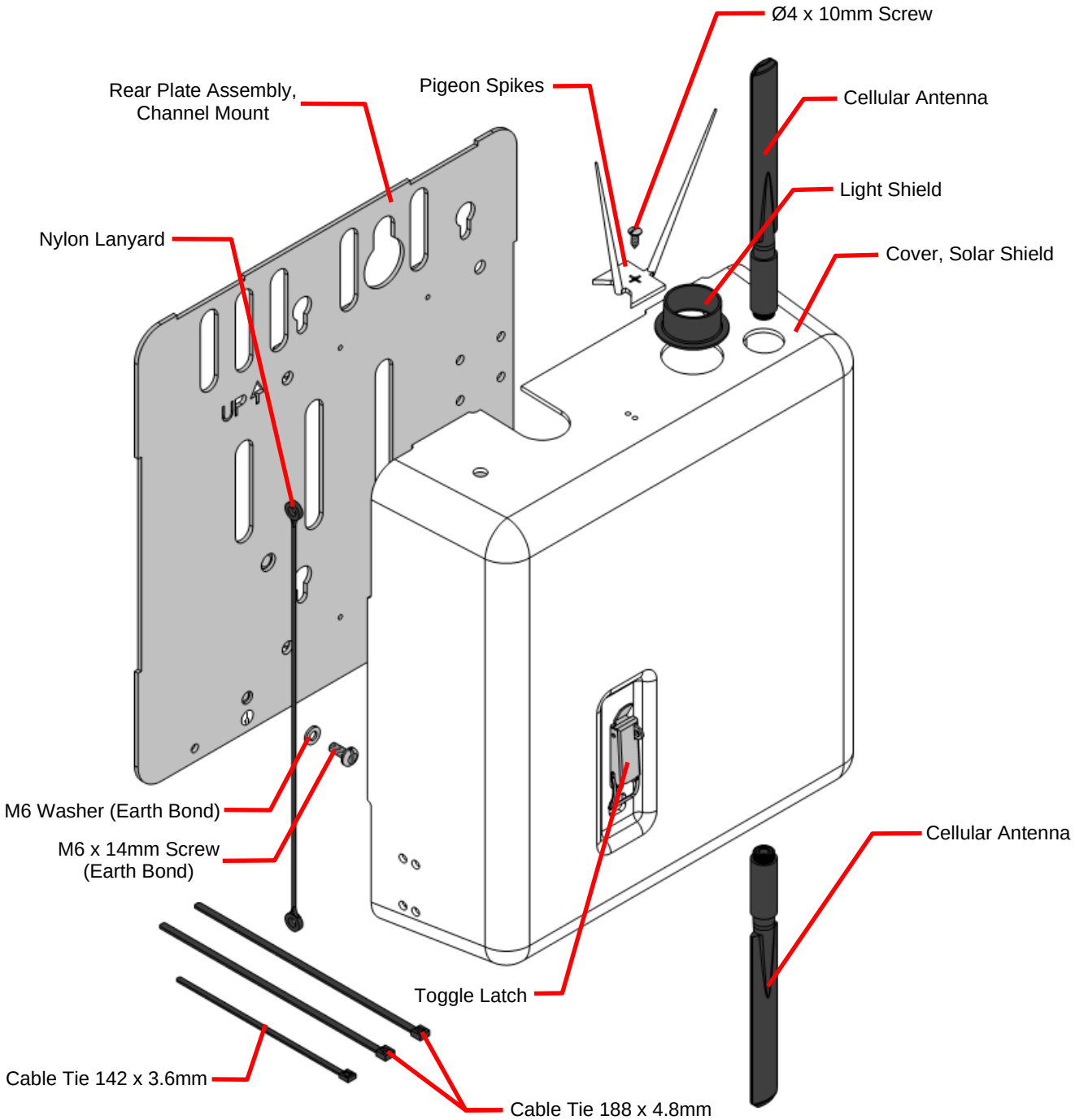
4.3.1 Telensa Products

1) **Basestation Pack**

2) **UNB Antenna** (868MHz or 915MHz variant)

3) **Mounting Kit** (strap-mount or wooden pole variant)

4.3.2 Strap-Mount Kit

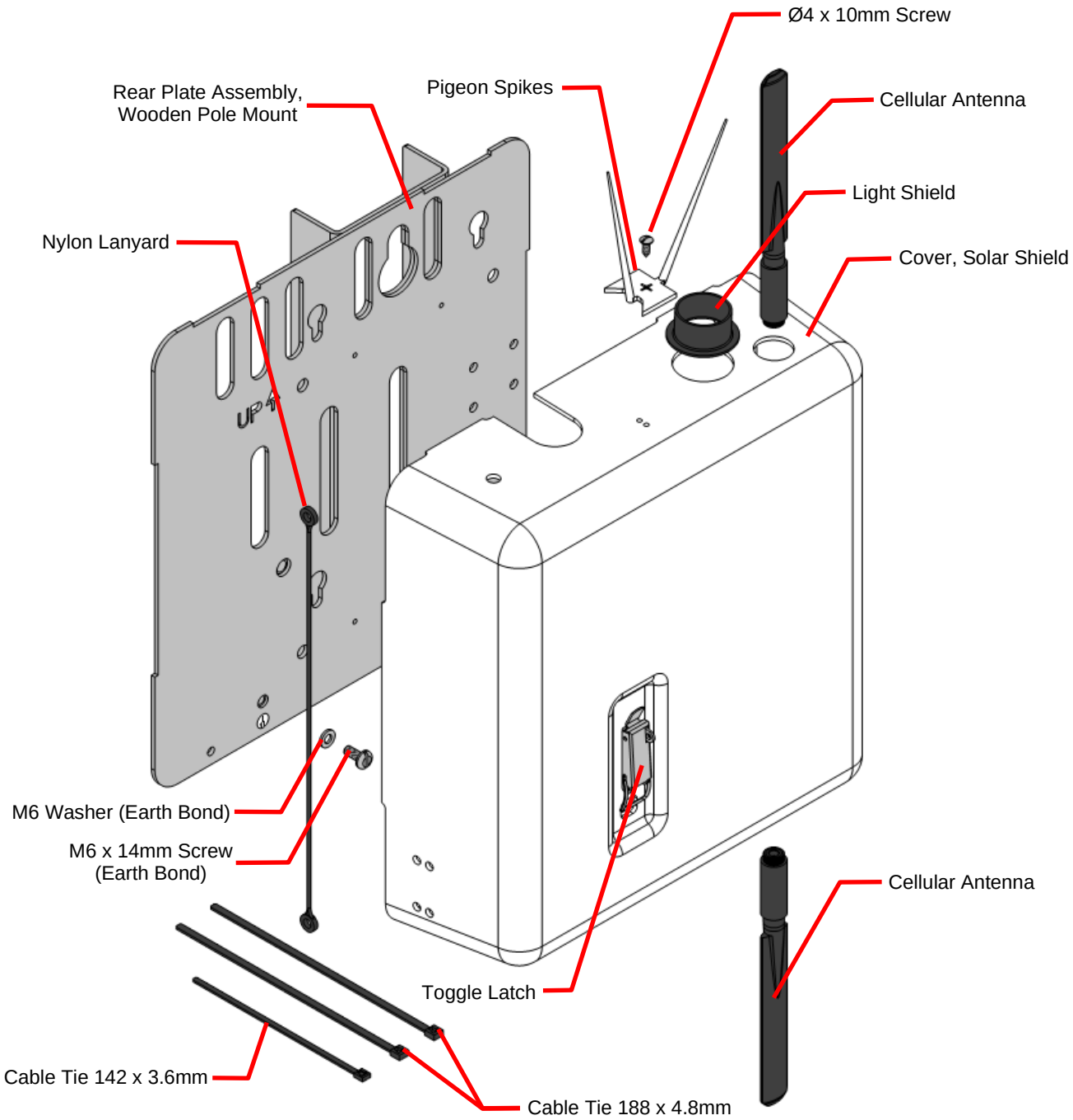


Tamtorque® Bands

- 2 x 100mm
- 2 x 130mm
- 2 x 160mm

2 x Universal Channel Clamps

4.3.3 Wooden Pole-Mount Kit



4.3.4 Lighting Contractor Supply List

- An isolator switch with separate fuse for the Basestation (fitted by contractors at the column/pole base)
- 0.75mm^2 (or AWG 18) conductor flex mains cable, for the connection of the Basestation to the mains
- A grommet or sealant for the Ø20mm cable hole at the top of the column/pole
- Tools and equipment:
  - Suitable vehicle for access
  - Cordless drill
  - 20mm HSS (high-speed steel) drill bit
  - Basic electrician's tool kit (including wire strippers and Pozi/slotted screwdrivers)
  - Side cutter

4.3.5 Specialist Installer Supply Requirements

The Telensa Basestation Installation Kit (B4-TOOLKIT-S) is supplied free as part of the Telensa installation training, and additional kits can be purchased from Telensa as required.

Installers may use their own equivalent tools:

For All Installations

- Torque Wrench (¼" Square Drive) 2-10Nm
- 10mm Socket (¼" Square Drive)
- 6mm Hex Bit (¼" Hex Drive)
- 5mm Hex Bit (¼" Hex Drive)

To Fit Power Cable / Refit Gland Only

- Torque Screwdriver (¼" Hex Drive) 0.5-0.8Nm
- Socket Converter ¼" Square Drive (Female) to ⅜" Square Drive (Male)
- 25mm Crow Foot Spanner (⅜" Square Drive)
- 27mm Crow Foot Spanner (⅜" Square Drive)
- 3mm Slotted Screwdriver Bit (¼" Hex Drive)
- 5.5mm Slotted Screwdriver Bit (¼" Hex Drive)

Strap-Mount Installations Only

- Tamtorque® Tool

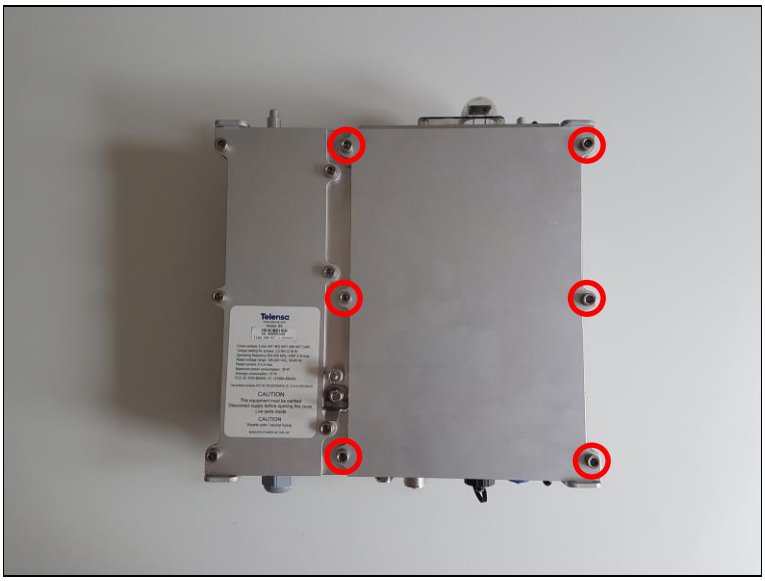
Wooden Pole Installations Only

- 2 x ⅝" Hex Bolts (Stainless Steel) to suit pole diameter and mounting plate depth
- 4 x ⅝" Hex Nuts (Stainless Steel)
- 4 x ⅝" Washers (Stainless Steel)

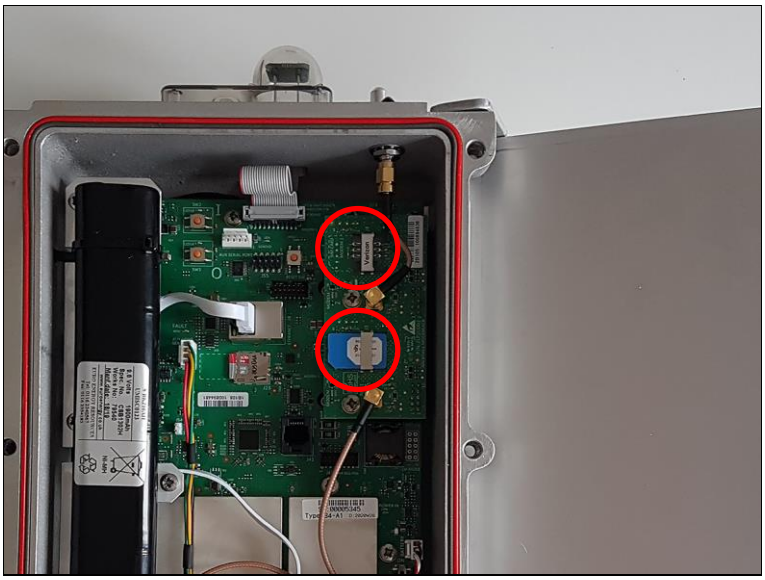
4.4 Preparation for Installation

4.4.1 SIM Card Installation

1) Loosen the six M6 captive screws on the larger, right-hand compartment using a 5mm hex bit and open the door.



2) Insert the SIM card/s in the carriers, ensuring that they are correctly oriented.

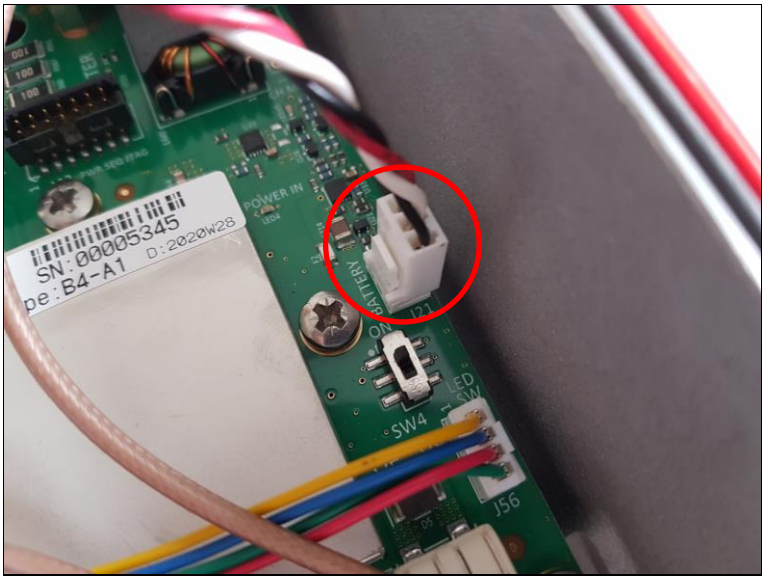


Note:
- SIM cards will usually be pre-installed by Telensa prior to delivery
- Some modems take mini SIM cards, and some take micro SIM cards
- Lower SIM for modem 1 (lower antenna) and upper SIM for modem 2 (upper antenna)
- Also see section 8 ‘SIM Card Replacement’

4.4.2 Connect the Battery

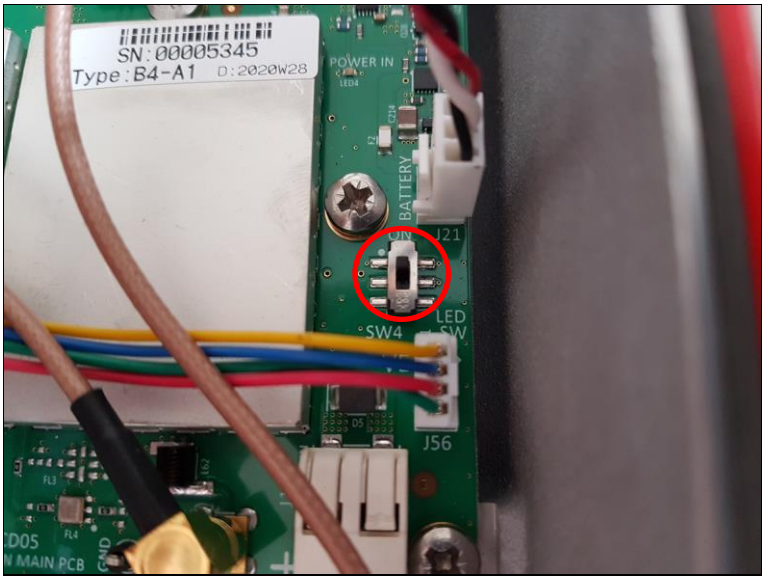
Attach the battery connector wire to the PCB.

ALERT: Attach carefully to avoid damage to the connector.



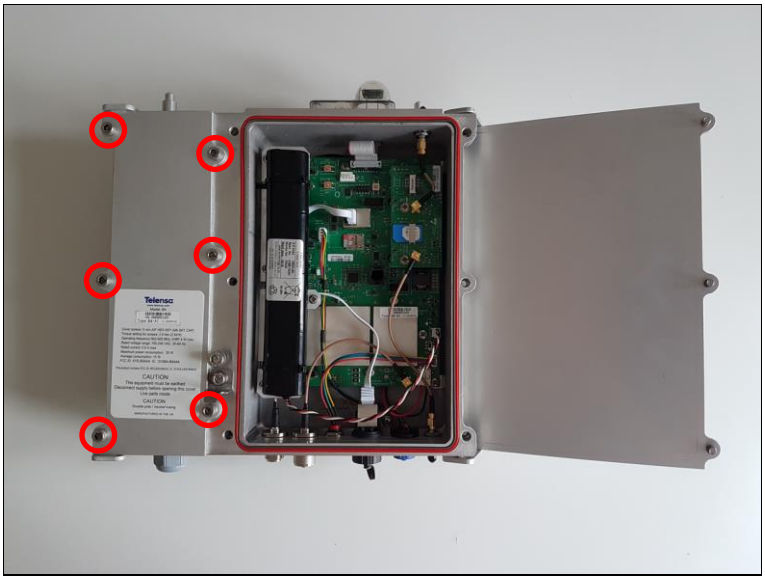
4.4.3 Set Switch for Power LED

1) Enable or disable the power status LED on the bottom of the Basestation using the switch.

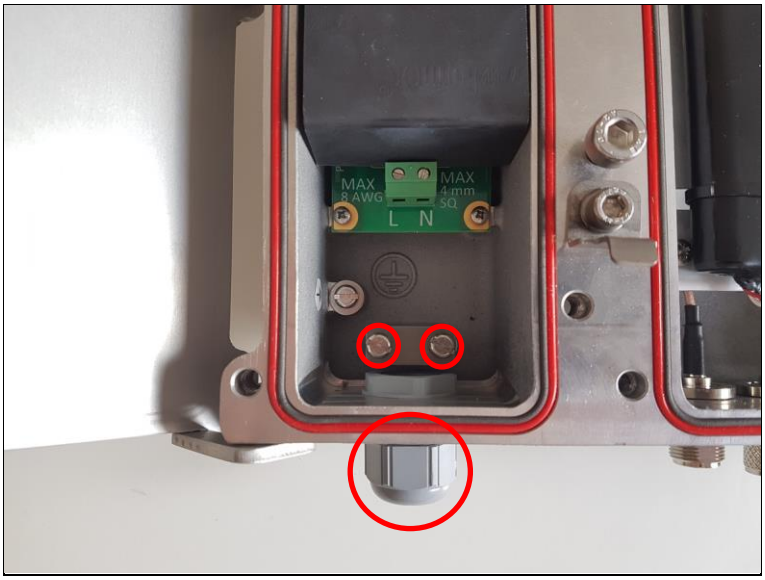


4.4.4 Fitting Power Cable Tail (if required)

1) Loosen the six M6 captive screws on the smaller, left-hand compartment using a 5mm hex bit and open the door.

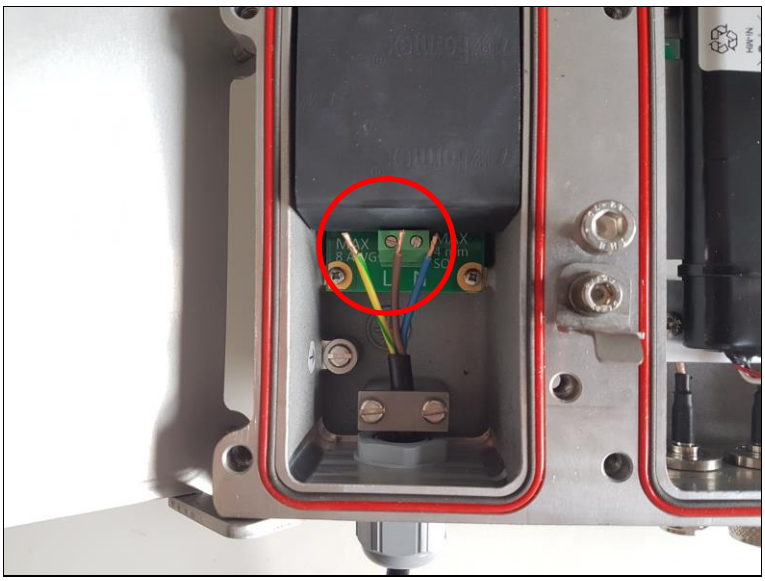


2) Loosen the cable gland and two cable grip screws.

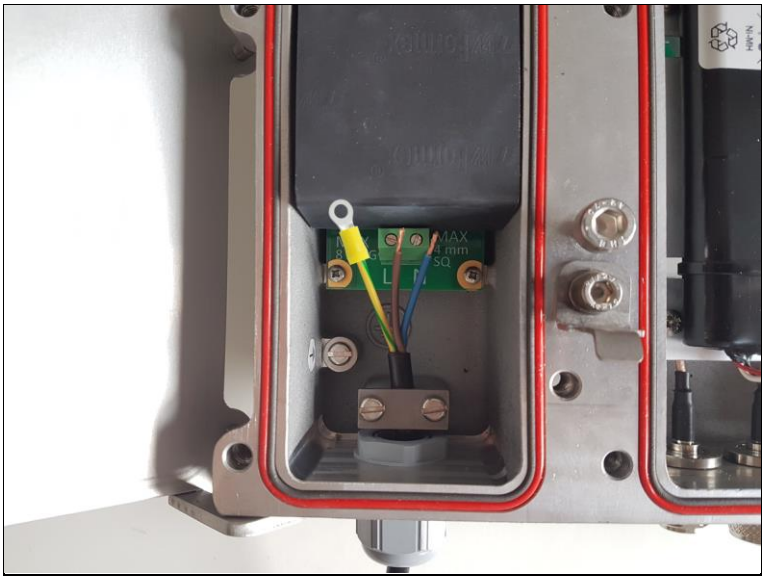


3) Feed the power cable into the cable gland and under the cable grip. Strip all three wires so that 5mm of copper core is visible.

ALERT: The earth wire should be longer than the live and neutral wires so that it is the last cable to be pulled out should the cable clamp fail.



4) Crimp a 4mm ring terminal onto the earth wire.



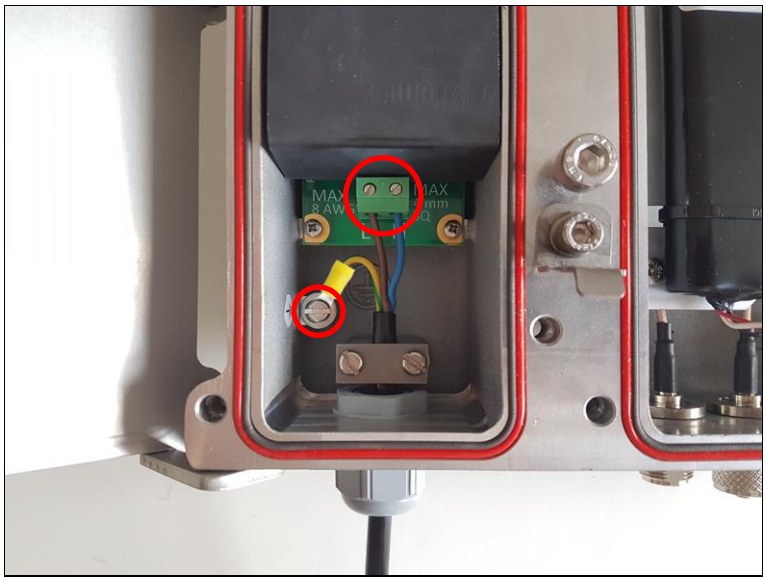
ALERT: The earth wire must have a suitable M4 or equivalent ring terminal fitted to ensure correct termination.

5) Attach the safety earth wire ring terminal to the earth point and tighten the M4 screw to 0.5 Nm.

Attach the live wire to the ‘L’ terminal on the mains power connector block, and the neutral wire to the ‘N’ terminal, tightening both screws to 0.56 – 0.79 Nm.

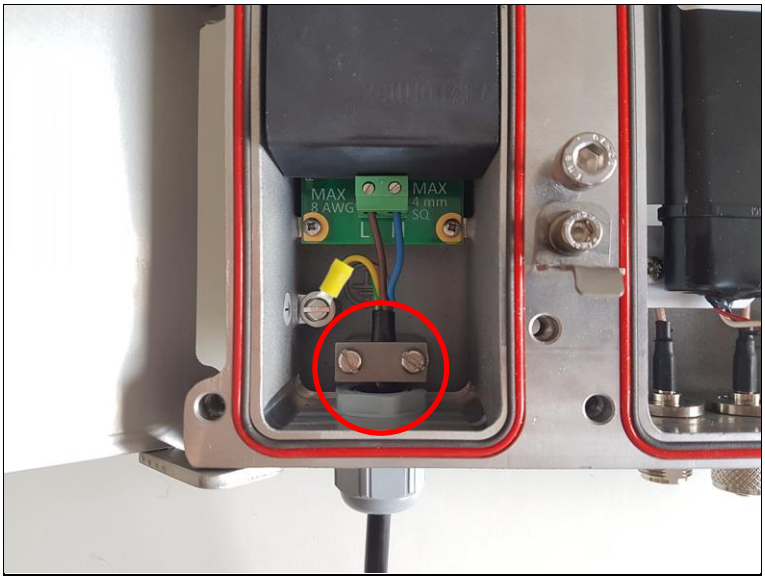
ALERT: Overtightening may result in damage to the terminal block.

Terminal	UK Wire Colour	US Wire Colour
Earth		
Live		
Neutral		



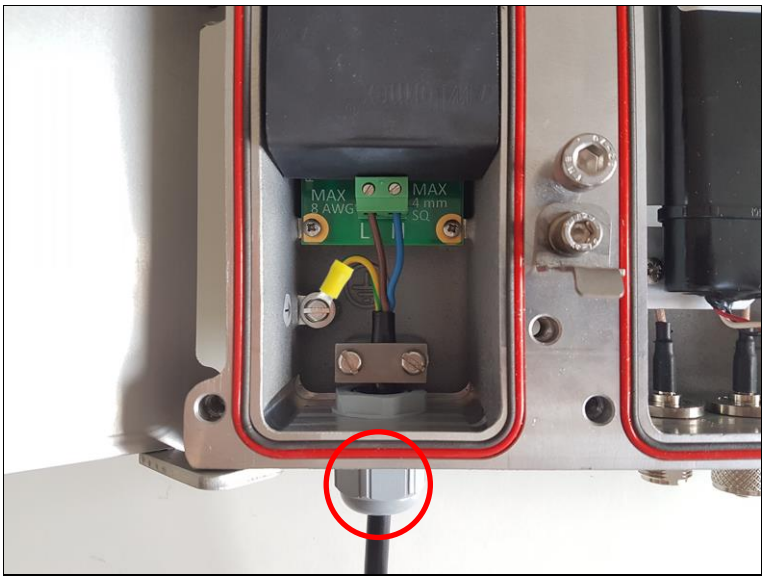
6) Tighten the two M4 slotted screws on the power cable clamp.

ALERT: Ensure that the cable is securely clamped, but without damaging it



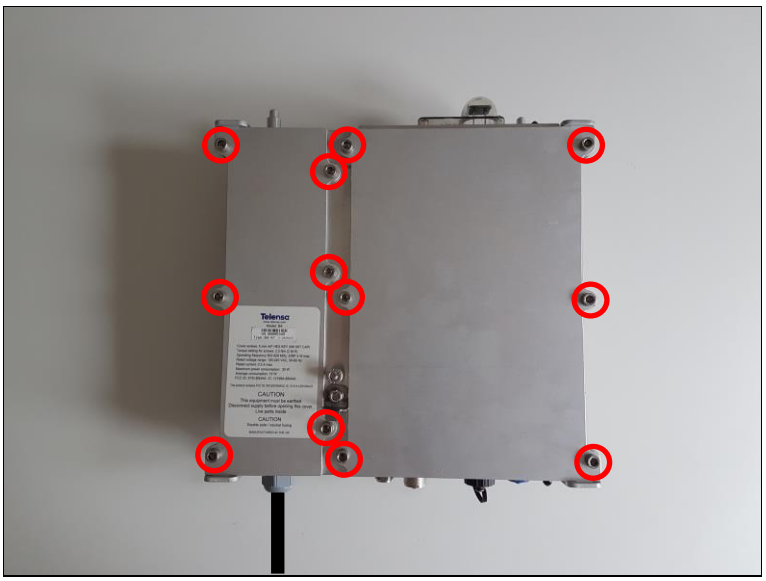
7) Tighten the dome nut to 2Nm using a 25mm crow foot spanner and torque wrench, gripping the body of the gland with a standard 25mm open-ended wrench to prevent it rotating.

Note: To fit a new gland, a 27mm crow foot spanner is also required



8) Close the compartment doors and tighten the twelve M6 captive screws to 2.5Nm using a 5mm hex bit and torque wrench.

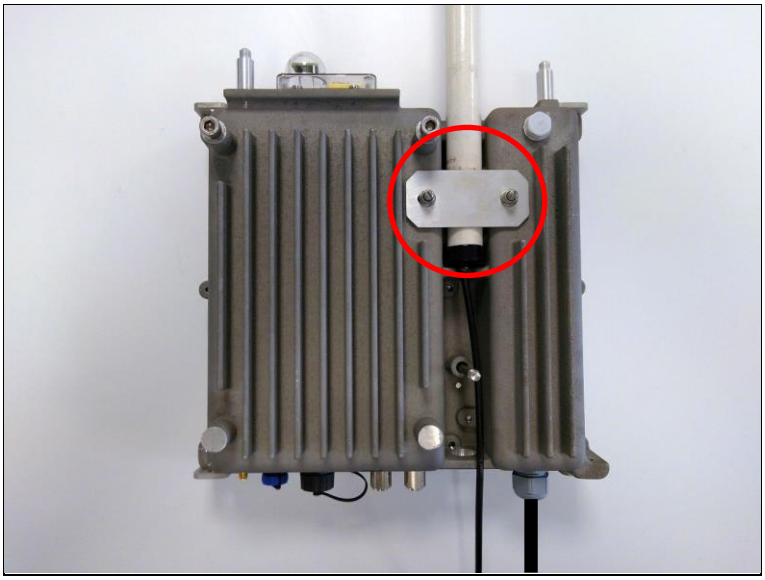
ALERT: Tighten screws from the centre of the doors first and work outwards. Failure to do so could distort the door plates and result in them not sealing properly.



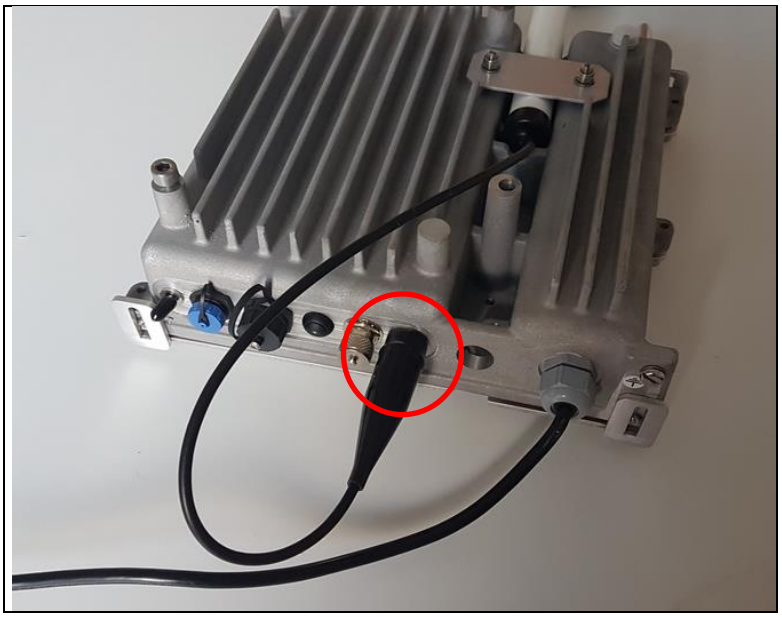
4.5 Installation

4.5.1 Attaching UNB Antenna

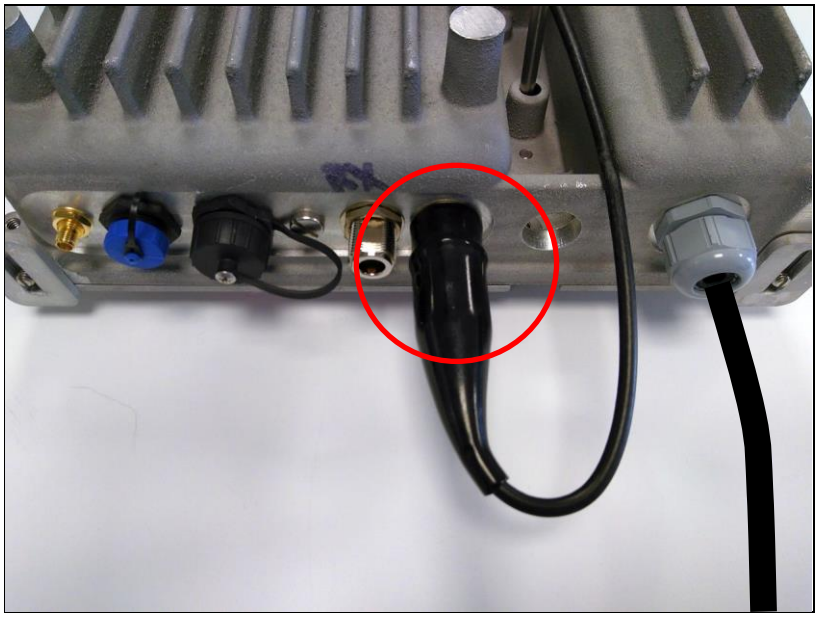
1) Slide the UNB antenna behind the antenna bracket so that the black cap rests on the step on the casting. Tighten the two M6 nylon lock nuts to 2.5Nm using a 10mm socket and torque wrench.



2) Connect the UNB antenna leads to the port nearest to the antenna.



3) Slide the PVC sleeve over the connector.



Note: Solar shield and cellular antennas are installed after the Basestation is attached to the pole.

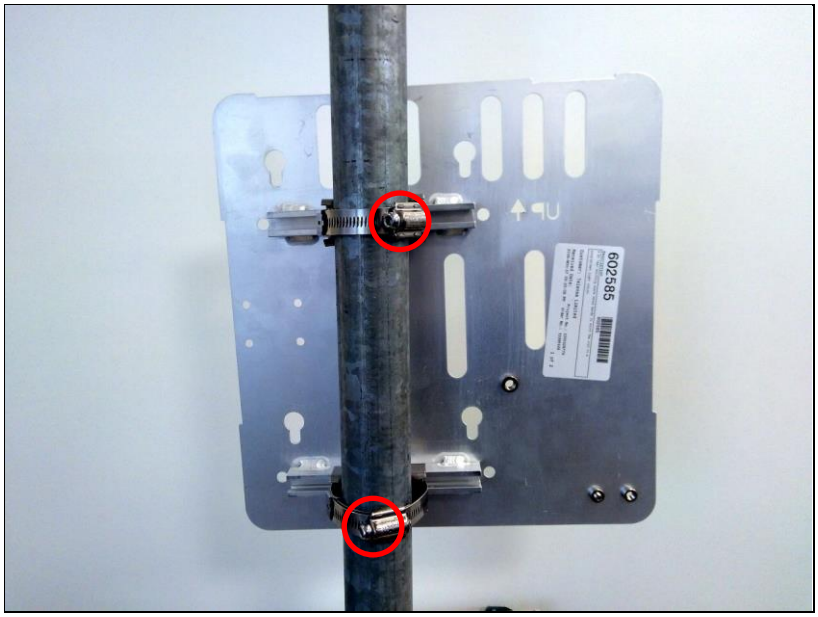
4.5.2 Install Mounting Kit

4.5.2.1 Fitting Strap-Mount Kit

1) Feed two Tamtorque® bands through the channel in the mounting plate (strap-mount kit only).

2) Fit the mounting plate to the lamp post and tighten the two bands securely using a Tamtorque® tool.

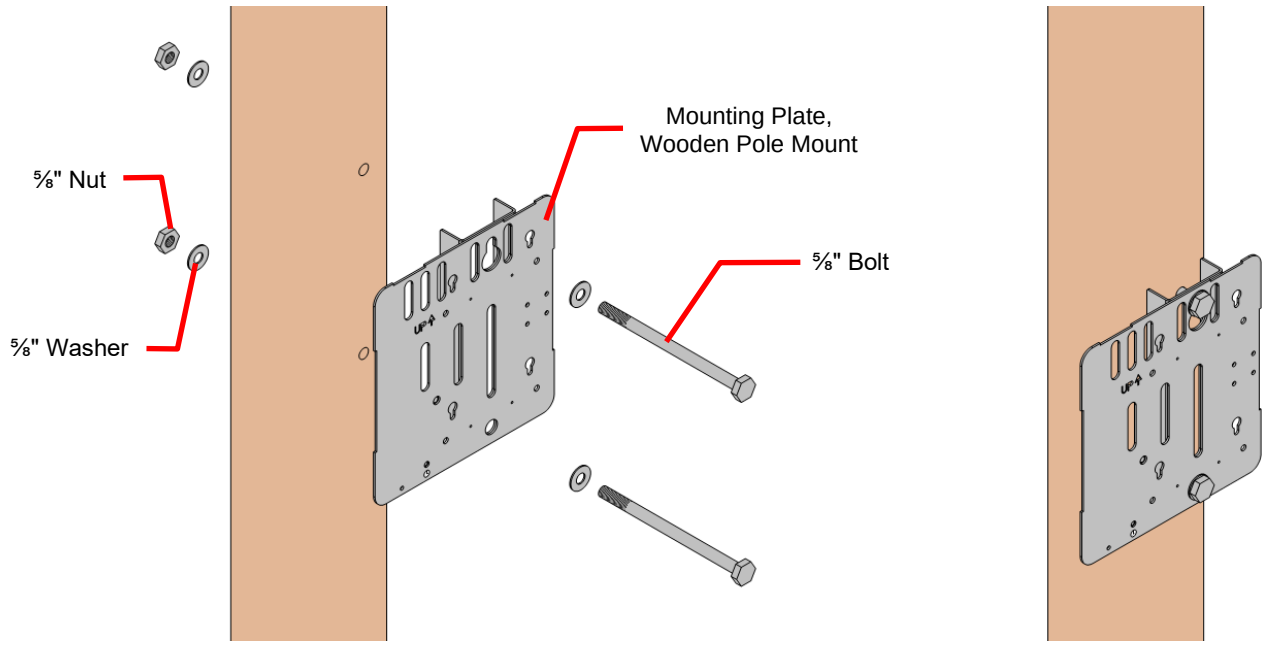
ALERT: Ensure both bands are tightened fully to avoid any risk of slipping.



4.5.2.2 Fitting Wooden Pole-Mount Kit

1) Drill two through holes in the wooden pole

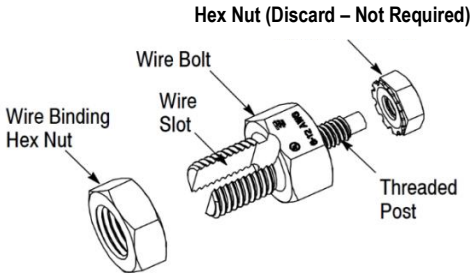
2) Insert two ⅝" bolts (length dependant on pole diameter) using washers at both ends, and securely attach nuts



4.5.3 Earth Bolt Instructions (Option for Wooden Pole Mount Only)

The Basestation mounting bracket for wooden pole installations is supplied with an earth bolt, so a solid earth wire can be fitted.

ALERT: The safety earth is the earth wire of the mains supply, which must be connected inside the Basestation 4 unit



The earth bolt supports the following wire types:

- Uninsulated solid copper wire, sizes 6 to 12 AWG
- Uninsulated 7 or 19 stranded copper wire, sizes 6 to 10 AWG

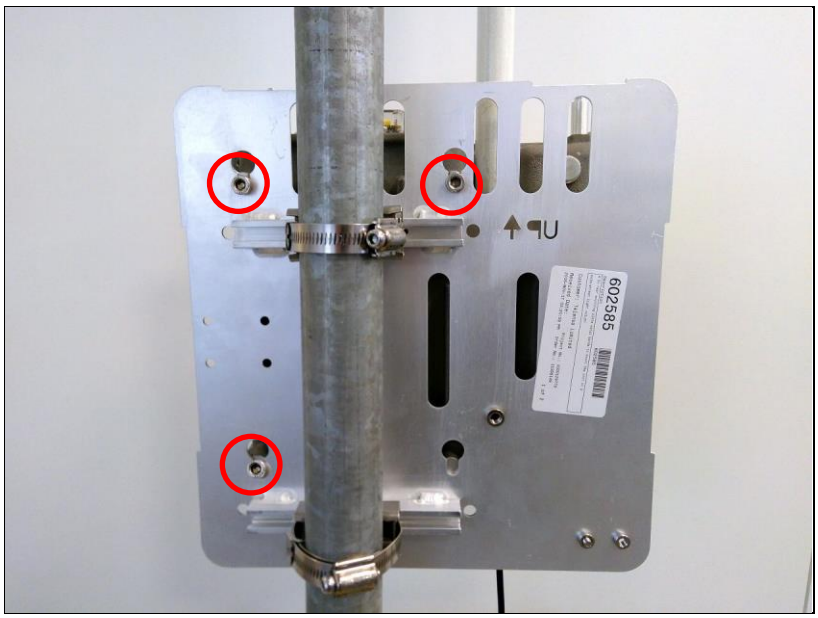
4.5.4 Earth Wire Fitting Procedure

1) Remove the mounting hex washer nut and put to one side. If required, hold the body of the bolt with a 9/16" open end wrench, and the nut with an 11/32" socket wrench.
2) Remove the wire binding hex nut. If required, hold the hold the body of the bolt with a 9/16" open end wrench, and the nut with a 9/16" socket wrench.
3) Screw the wire bolt into the earth point on the back of the mounting plate and tighten to a torque of 2.8Nm with a 9/16” socket wrench that will accommodate the wire slot. If this is not possible, the mounting hex washer nut removed in step 1 can be used to fix the bolt through a hole in the mounting plate.
4) Position the wire into the wire slot, noting the wire requirements in the description above.
5) Thread the wire binding hex nut on to the wire slot end of the earth bolt. Finger-tighten until the wire is compressed
6) Holding the hex body with a 9/16” open end wrench, tighten the wire binding hex nut with a 9/16" socket wrench to a torque of 5Nm

4.5.5 Mounting the Basestation

1) Attach the Basestation to the mounting plate by locating the three M8 screws into the keyhole slots and lowering into position.

ALERT: Ensure all three screws are correctly located in the keyhole slots.

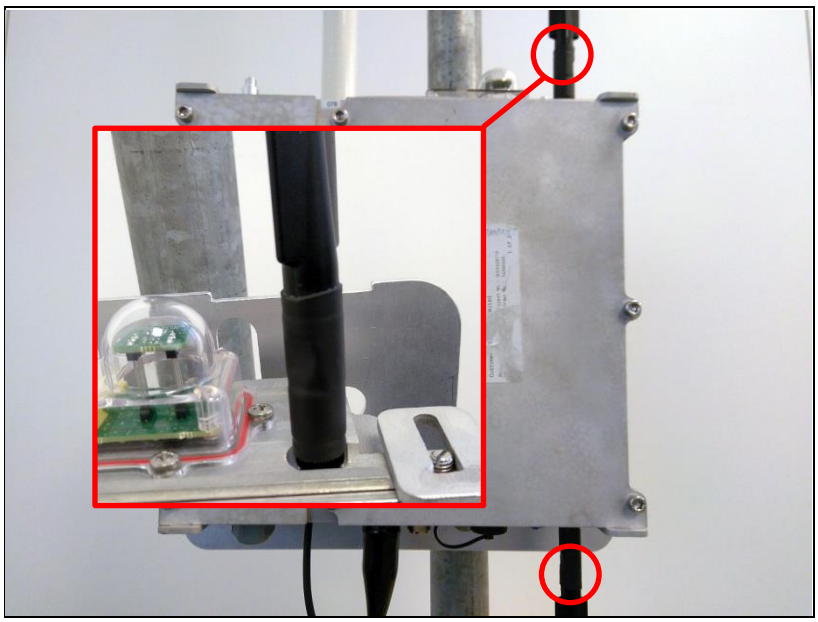


2) Locate the M8 x 95mm captive screw into the threaded insert on the mounting plate and tighten to 10Nm using a 6mm hex bit and a torque wrench, securing the Basestation to the mounting plate.

4.5.6 Attaching Cellular Antennas

Attach the two cellular antennas to the Basestation.

ALERT: Tighten by hand (no tools), turning the bottom rubberised section of the antenna - DO NOT use the paddle section of the antenna to avoid damage.

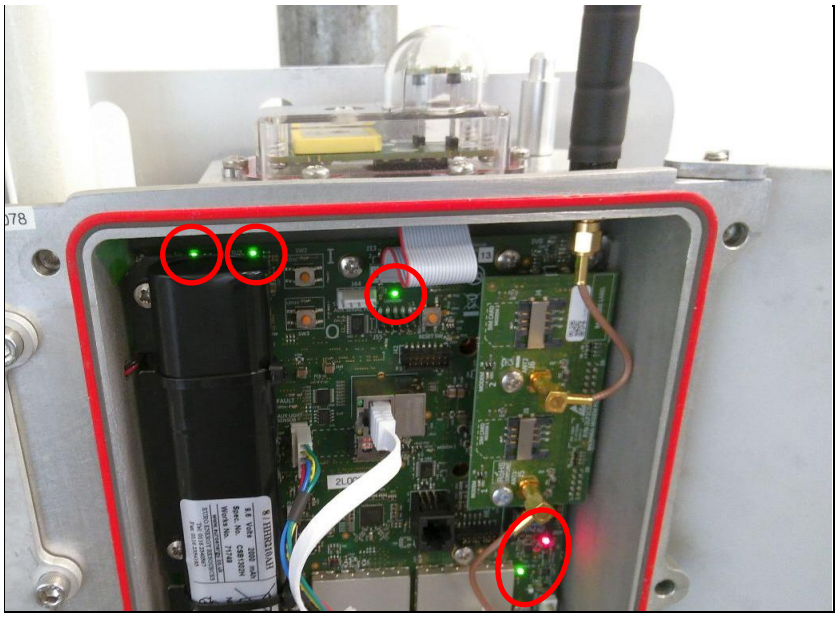


4.5.7 Apply Power

Apply mains power. The power indicator on the push button under the Basestation will now light if enabled in step 3 of ‘Installation Preparation’. Pressing the button will always enable the LEDs on the top of the Basestation, including the power LED (see section 10.1 ‘Light Sensor Board LEDs').

4.5.8 Initial Power Up Checks

Connect the mains power to check that the unit boots up – four green and one red LED indicators will illuminate.

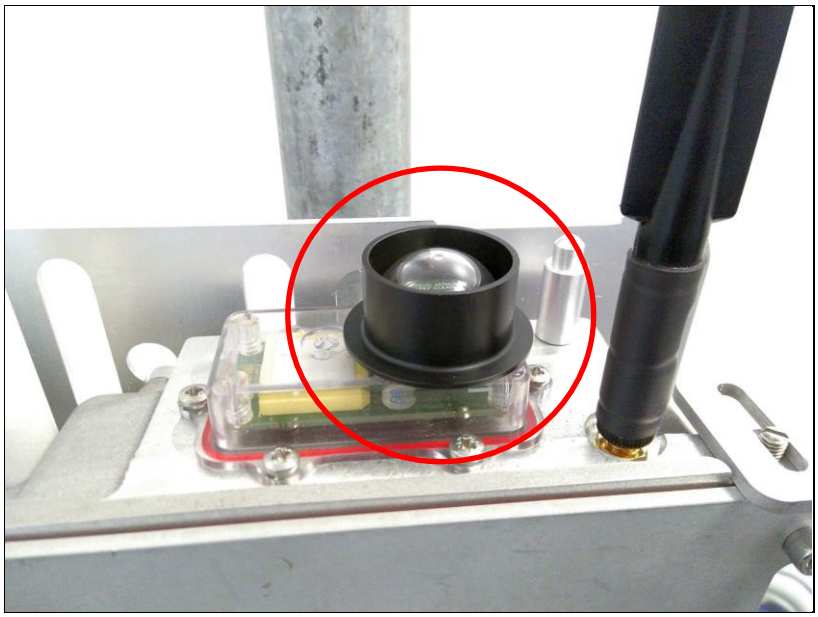


4.5.9 Verify Cellular Backhaul

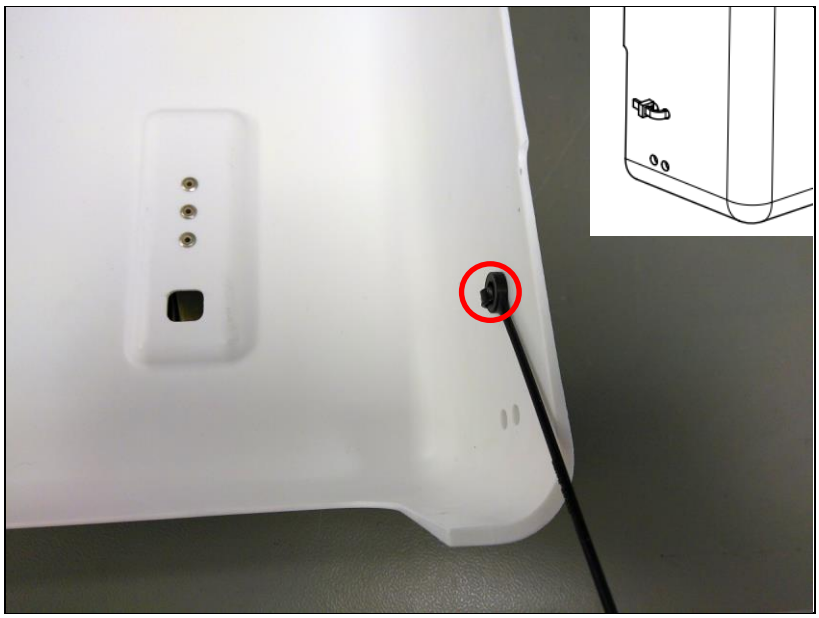
After a few minutes you can verify the cellular connection status by pressing the button under the base station and observing the status LED on the top (see section 10.1 ‘Light Sensor Board LEDs).

4.5.10 Fitting the Solar Shield

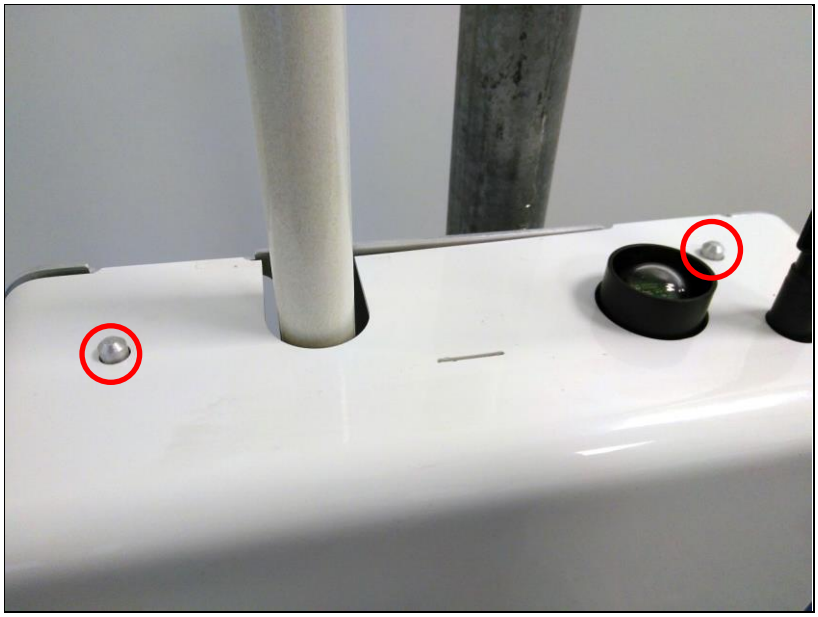
1) Fit the light sensor shield.



2) Attach the lanyard to the solar shield using a cable tie.

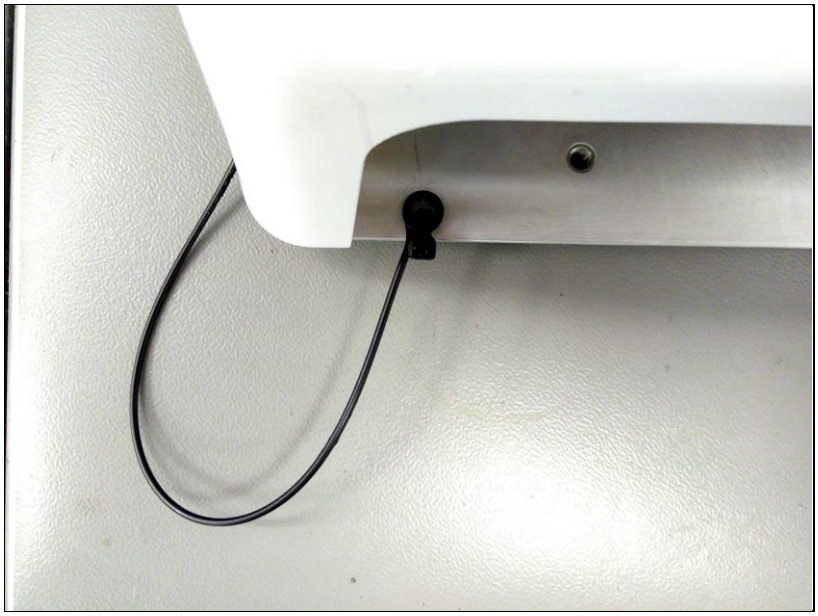


3) Fit the solar shield by locating the holes in the top of the shield over the upper cellular antenna and the two pins on the top of the Basestation.



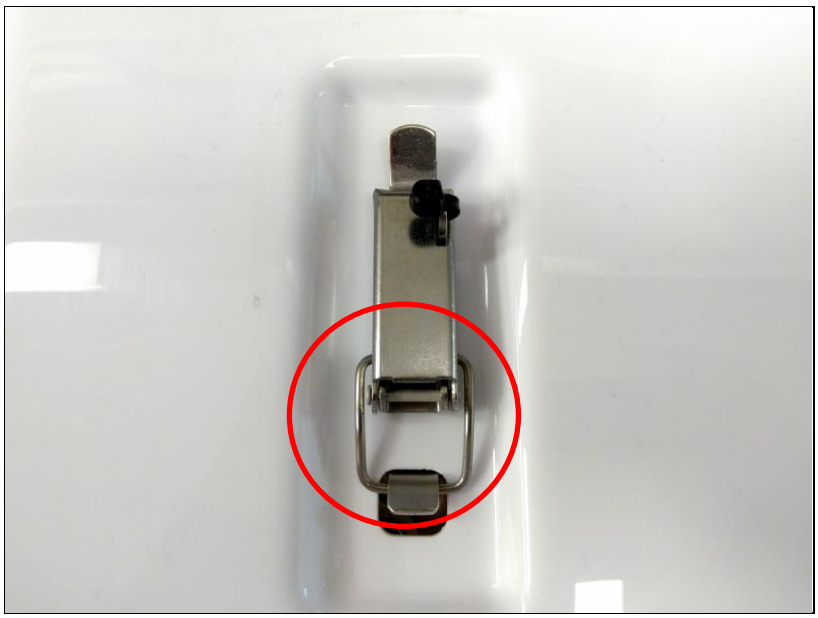
4) Attach the lanyard to the mounting plate using a cable tie.

ALERT: The safety lanyard must be fitted to secure the solar shield to the mounting plate



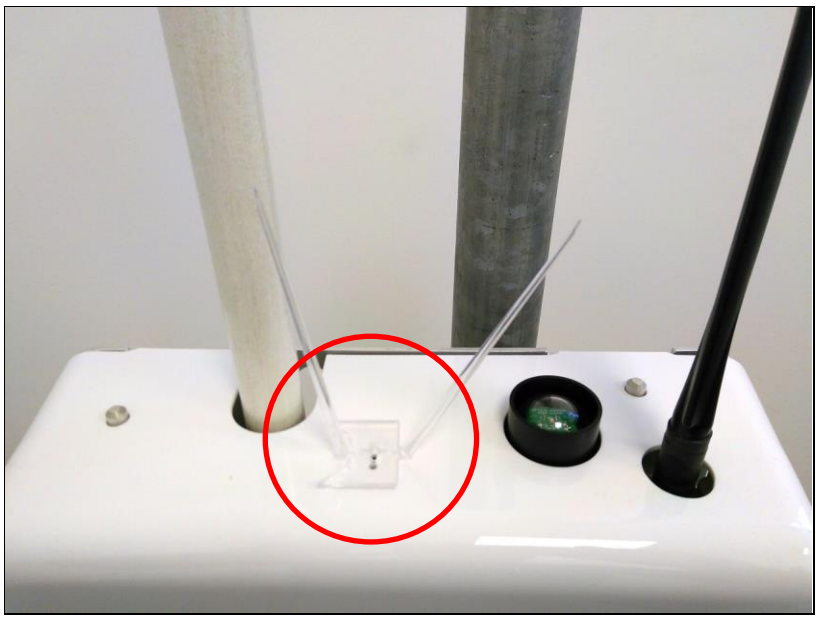
5) Clip the latch on the solar shield over the hook on the Basestation and secure it with a padlock or cable tie.

ALERT: A padlock or UV-stable cable tie MUST be fitted to the solar shield latch. Failure to do so may result in the solar shield becoming detached – risk of damage or injury



6) Fit the pigeon spikes to the top of the solar shield using the 4 x 10mm Pozi self-tapping screw.

ALERT: Bird spikes are a serious hazard and caution must be exercised after fitting



4.5.11 On-Site Installation

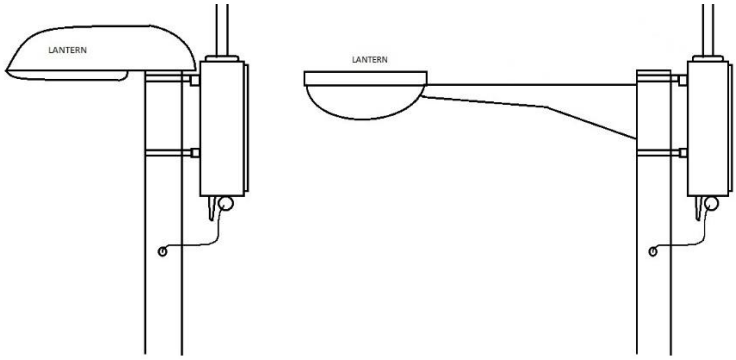
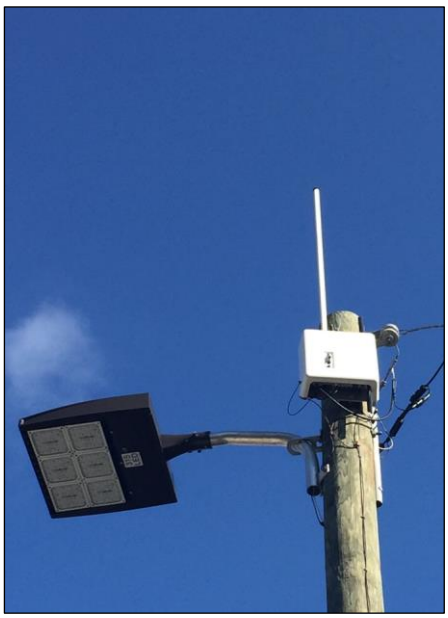


Figure 1: Strap-mount Basestation showing connector block and column entry point

Note: Ensure a grommet is fitted once the hole is drilled

Strap-mount Basestation installation showing power cable connection



Wooden pole-mount Basestation installation showing power cable connection

ALERT: Ensure the antenna is free from obstruction and that overhead cables are away from the antenna.

ALERT: Ensure the internal light meter is above the lamp to avoid light pollution.

ALERT: Ensure the Basestation is aligned both vertically and horizontally and that all cables are neatly hidden.

4.6 General Requirements for all Basestations

4.6.1 Requirements for Commissioning

Commissioned by Telensa operational staff (remotely).

4.6.2 Site Installation Requirements

1) Telephone Telensa Support to confirm that the Basestation is connected to the Central System Server:

- **UK: +44 (0)1223 677 050**
- **APAC: +6 44 886 0110**
- **USA: +1 855 399 7900**

Note: Connection to the Central System Server could take a few minutes.

2) Take a photograph of the installation and forward to support@telensa.com clearly stating the location (including column number) and the eight-digit serial number (located beneath the bar code on the PSU cover label).

5 Commissioning a Basestation

Basestations are configured by Telensa engineers prior to delivery.

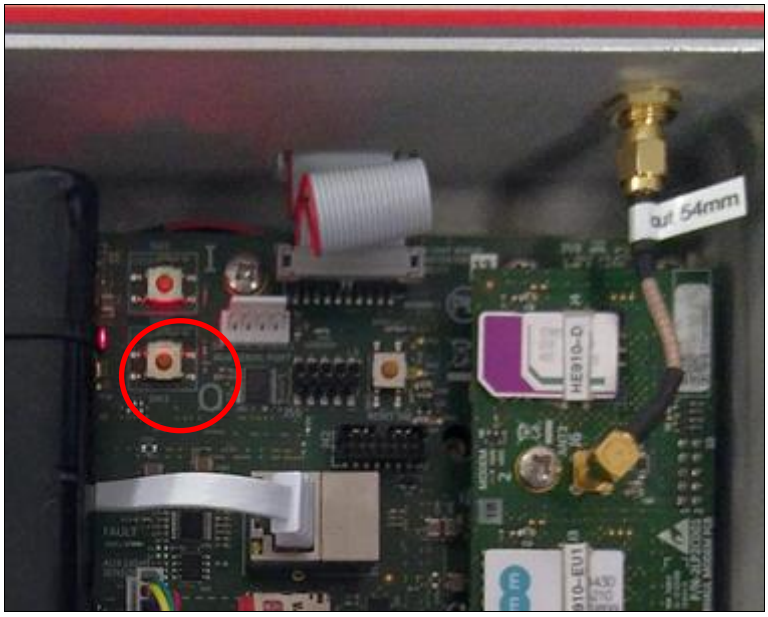
Once installed, the installer must call the support line with the following information:

1) Eight-digit serial number (see previous page)

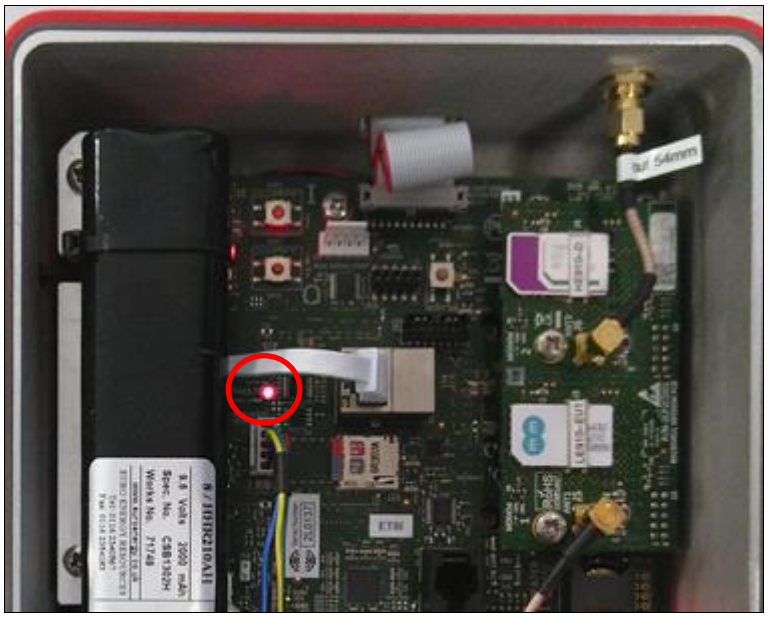
2) Location of the Basestation to allow the frequency plan to be instigated

6 System Shutdown Procedure

1) Press the ‘O’ (‘Off’) button

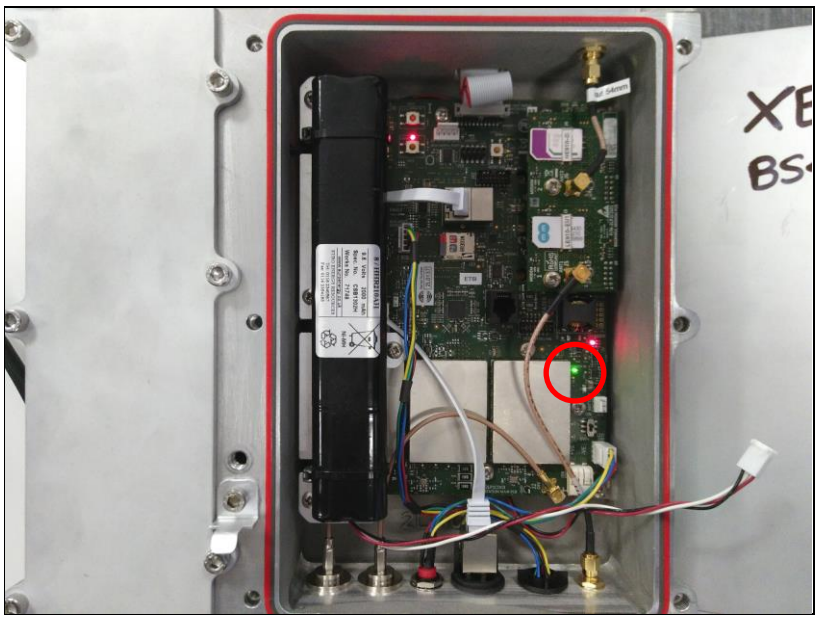


2) The red LED11 ‘Fault’ on the main board will flash, then remain illuminated – there may be a short delay



3) After several minutes, red LED14 (‘PicoZed suspended’) will illuminate

4) Green LED4 ‘Power In’ will illuminate.



ALERT: The unit is now in standby mode. It is powered but is actively disabled and does not function.

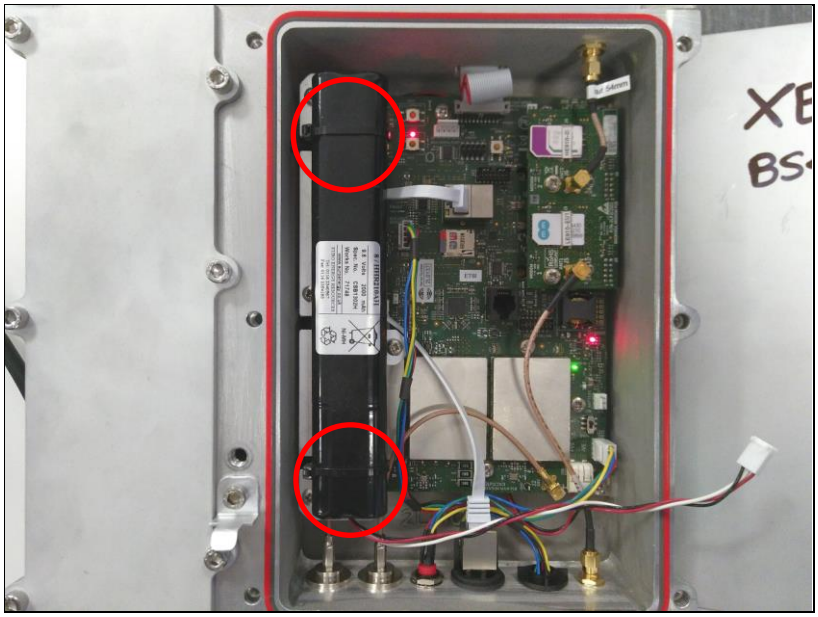
7 Battery Replacement

ALERT: Ensure that the ‘System Shutdown’ procedure (section 6System Shutdown Procedure) is followed before carrying out this process.

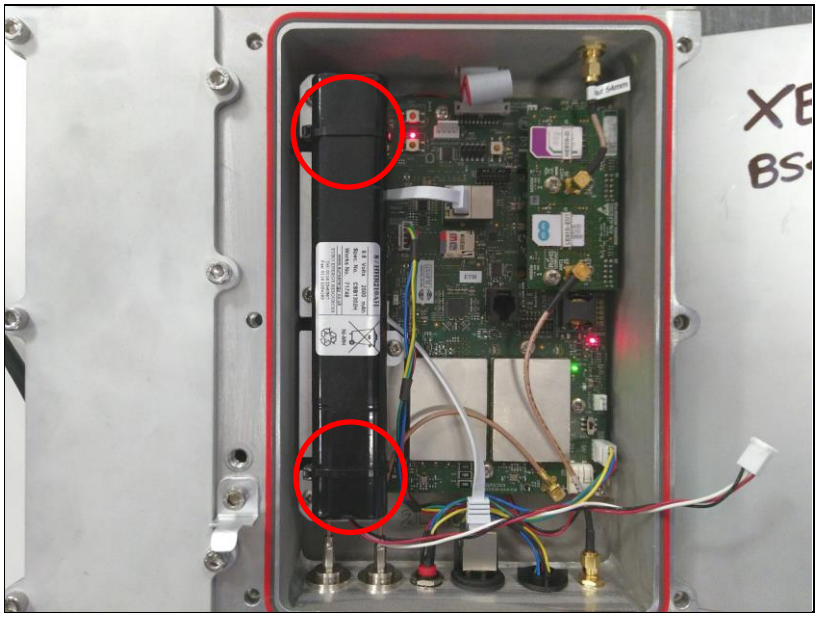
1) Carefully disconnect the battery lead from the main board.

ALERT: Detach carefully to avoid damage to the connector.

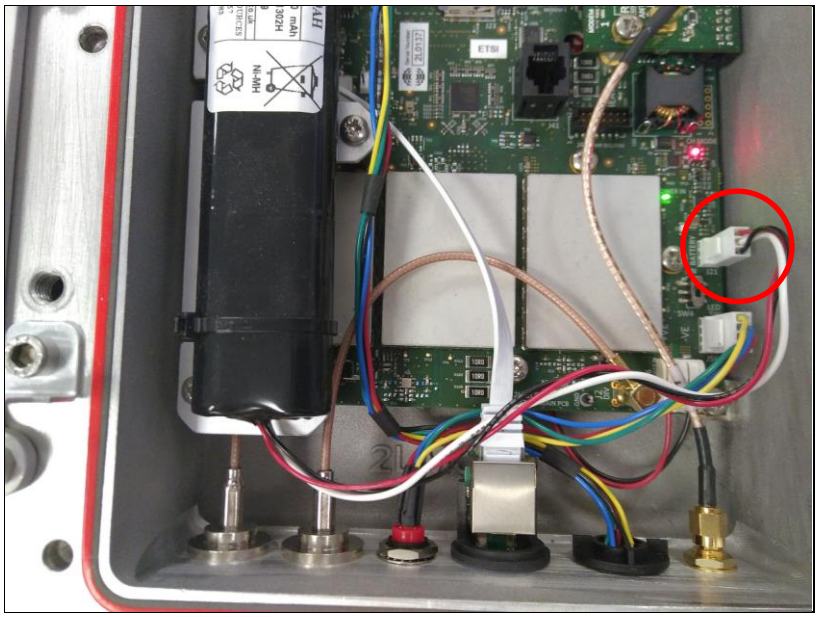
2) Cut the two cable ties using side cutters and remove the old battery.



3) Fit the new battery and secure with two cable ties.

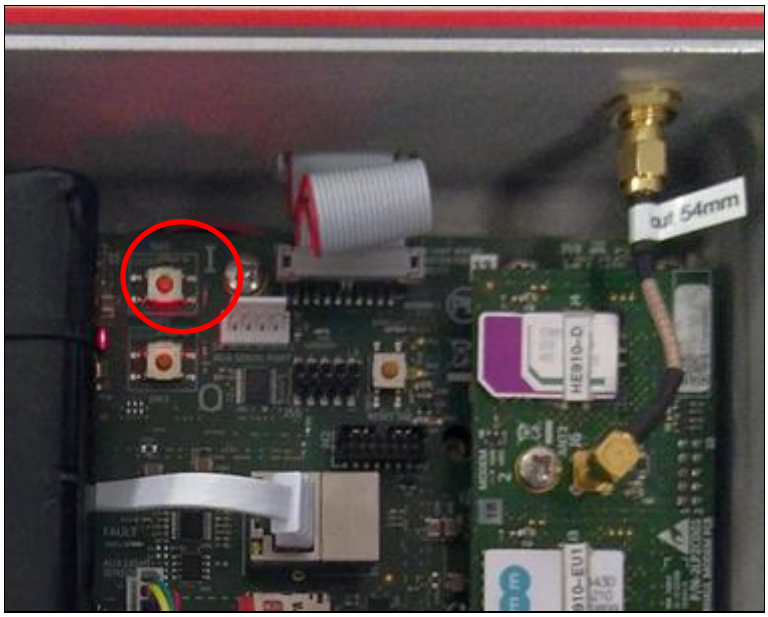


4) Carefully connect the battery lead to the main board.



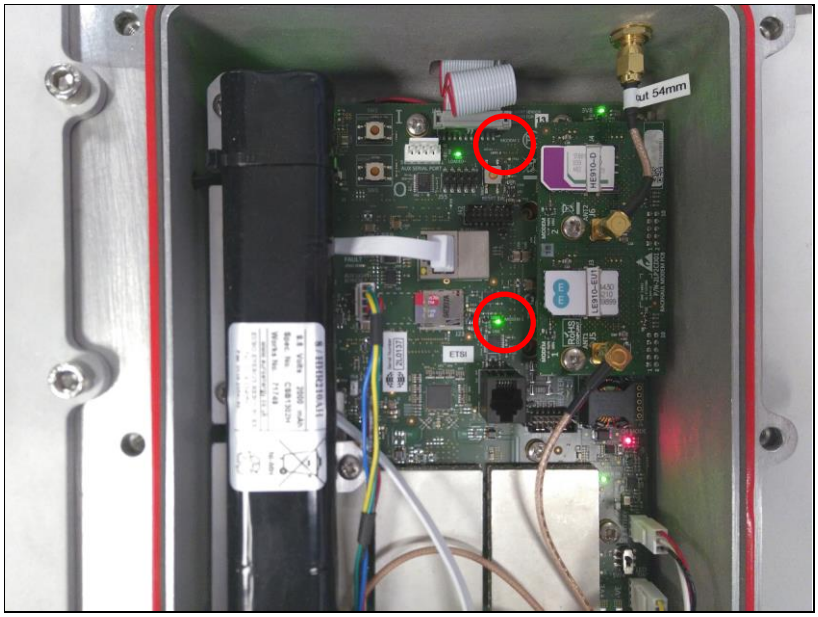
ALERT: Attach carefully to avoid damage to the connector.

5) Press the ‘I’ (‘On’) button on the main board.



6) Green LED9 ‘Loaded’ on the main board will illuminate.

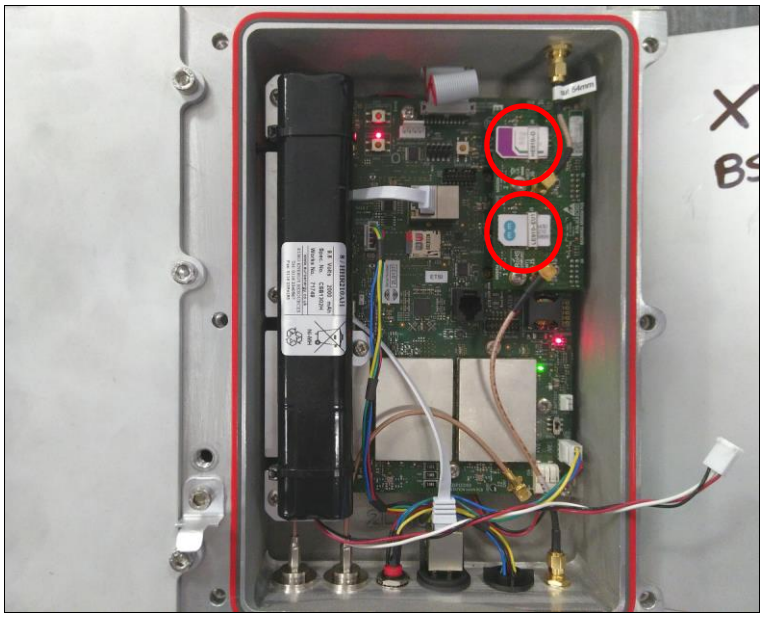
7) LED12 ‘Modem 1’ or LED13 ‘Modem 2’ will flash, signalling that the Basestation has basic connectivity to the internet.



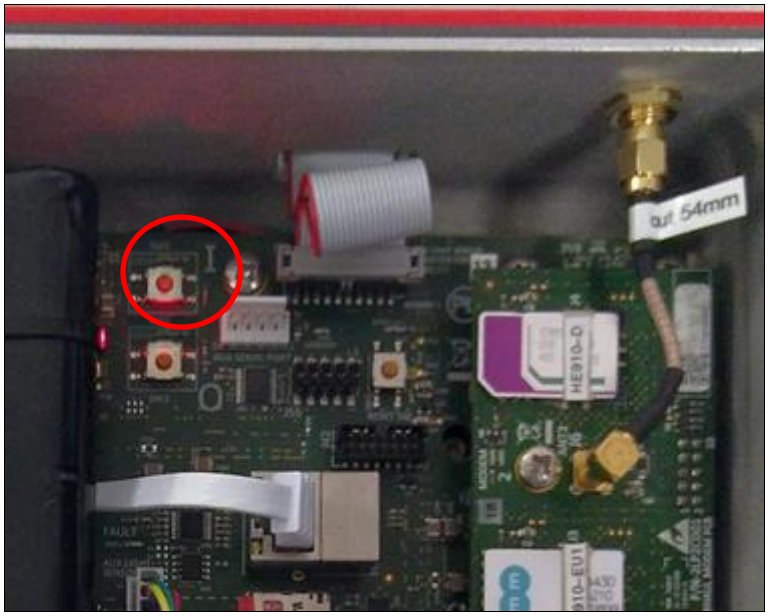
8 SIM Card Replacement

ALERT: Ensure that the ‘System Shutdown’ procedure (section 6) is followed before carrying out this process.

1) Insert the SIM card/s in the carriers, ensuring that they are correctly oriented.

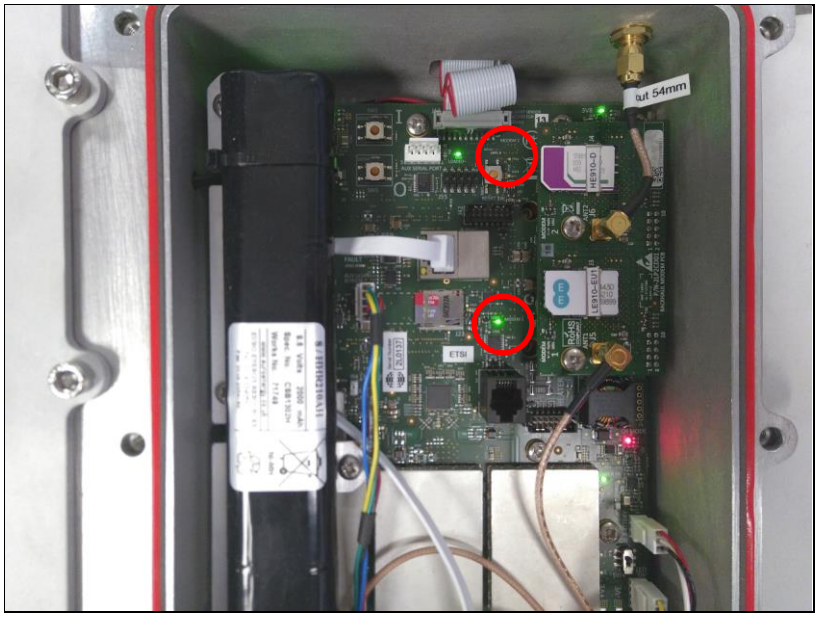


2) Press the ‘I’ (‘On’) button on the main board.



3) Green LED9 ‘Loaded’ on the main board will illuminate.

4) LED12 ‘Modem 1’ or LED13 ‘Modem 2’ will illuminate, signalling that the Basestation has connected.



9 Decommissioning a Basestation

ALERT: Run the ‘System Shutdown’ procedure (section 6) before beginning the decommissioning procedure

9.1.1 Disconnect the Battery

1) Loosen the six M6 x 20mm captive screws using a 5mm hex bit and open the RF compartment door.

2) Carefully remove the battery connector wire from the PCB.

ALERT: Detach carefully to avoid damage to the connector

9.1.2 Disconnect the Power Supply

ALERT: Ensure the mains power is disconnected before proceeding

1) Loosen the six M6 x 20mm captive screws using a 5mm hex bit and open the power supply door.

2) Loosen the screw terminals on the mains power connector block and remove the live and neutral wires.

3) Loosen the M4 x 10mm screw and remove the safety earth wire from the earth point.

4) Loosen the two M4 x 12mm slotted screws on the power cable clamp using a slotted screwdriver.

5) Loosen the dome nut using a 24mm crow foot spanner and wrench.

6) Pull the power cable out from the cable gland.

9.1.3 Detach the Cellular Antennas

Loosen both cellular antennas by hand (no tools), turning the bottom rubberised section of the antenna.

ALERT: To avoid damage, DO NOT use the paddle section of the antenna

9.1.4 Dismount the Basestation

1) Loosen the M8 x 95mm captive screw from the mounting plate using a 6mm hex bit and wrench.

2) Lift-up the Basestation to disengage the screws from the three keyhole slots on the mounting plate.

9.1.5 Remove the UNB Antenna

1) Slide the PVC sleeve down off over the connector.

2) Unscrew the UNB antenna connector from the socket.

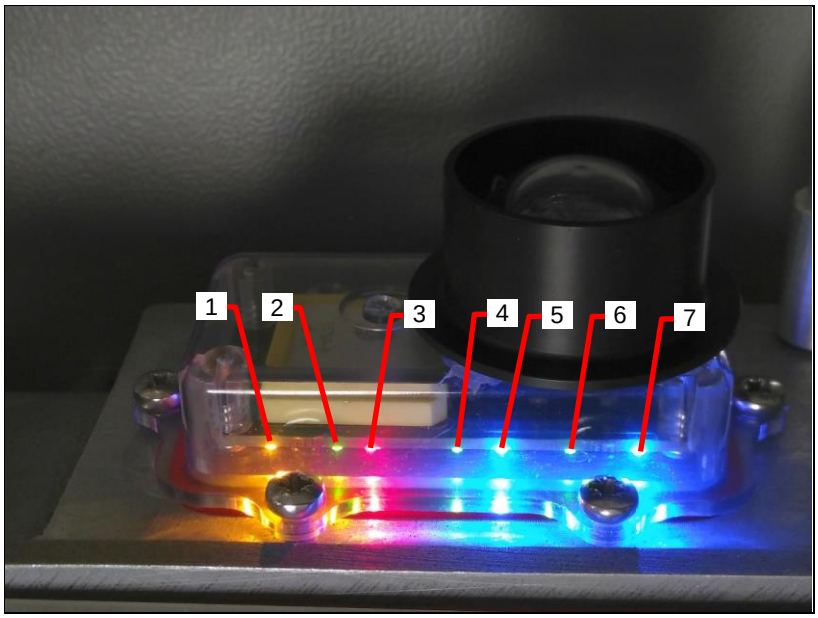
3) Loosen the two M6 nylon lock nuts using a 10mm socket and wrench.

4) Slide the UNB antenna up from the antenna bracket to release it.

10 LED Indicators

10.1 Light Sensor Board LEDs

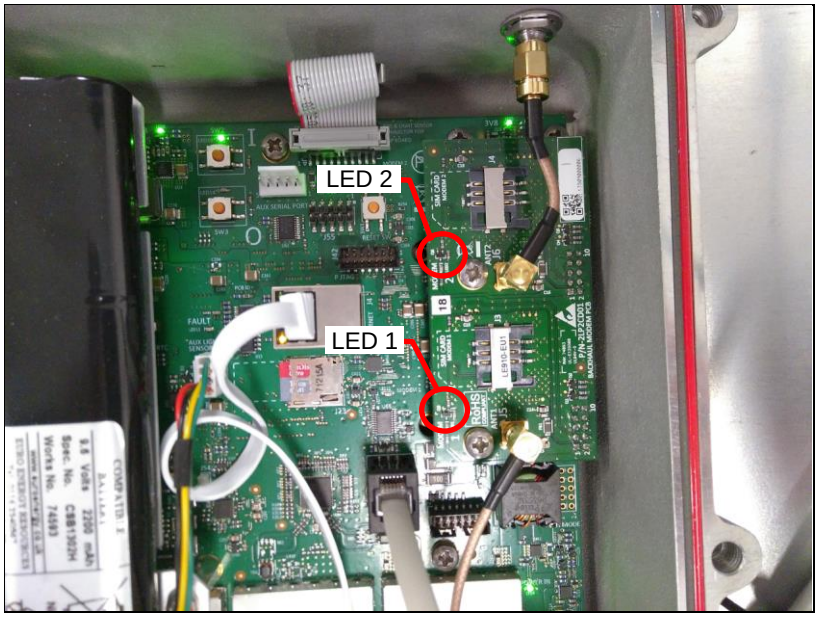
LED1		+12V Present (i.e. 12V output from mains PSU)
LED2		Indicates that BS4 has successfully booted and software system now running. Basic functionality OK
LED3		Fault/shutdown sequence indicator
LED4		Modem 1 (Lower Antenna) - indicates Central System VPN connection up: backhaul comms fully established
LED5		Modem 1 (Lower Antenna) - indicates basic internet connectivity established
LED6		Modem 2 (Upper Antenna) - indicates Central System VPN connection up: backhaul comms fully established
LED7		Modem 2 (Upper Antenna) - indicates basic internet connectivity established



Light Sensor Board LEDs

10.2 Backhaul/Cellular Board LEDs

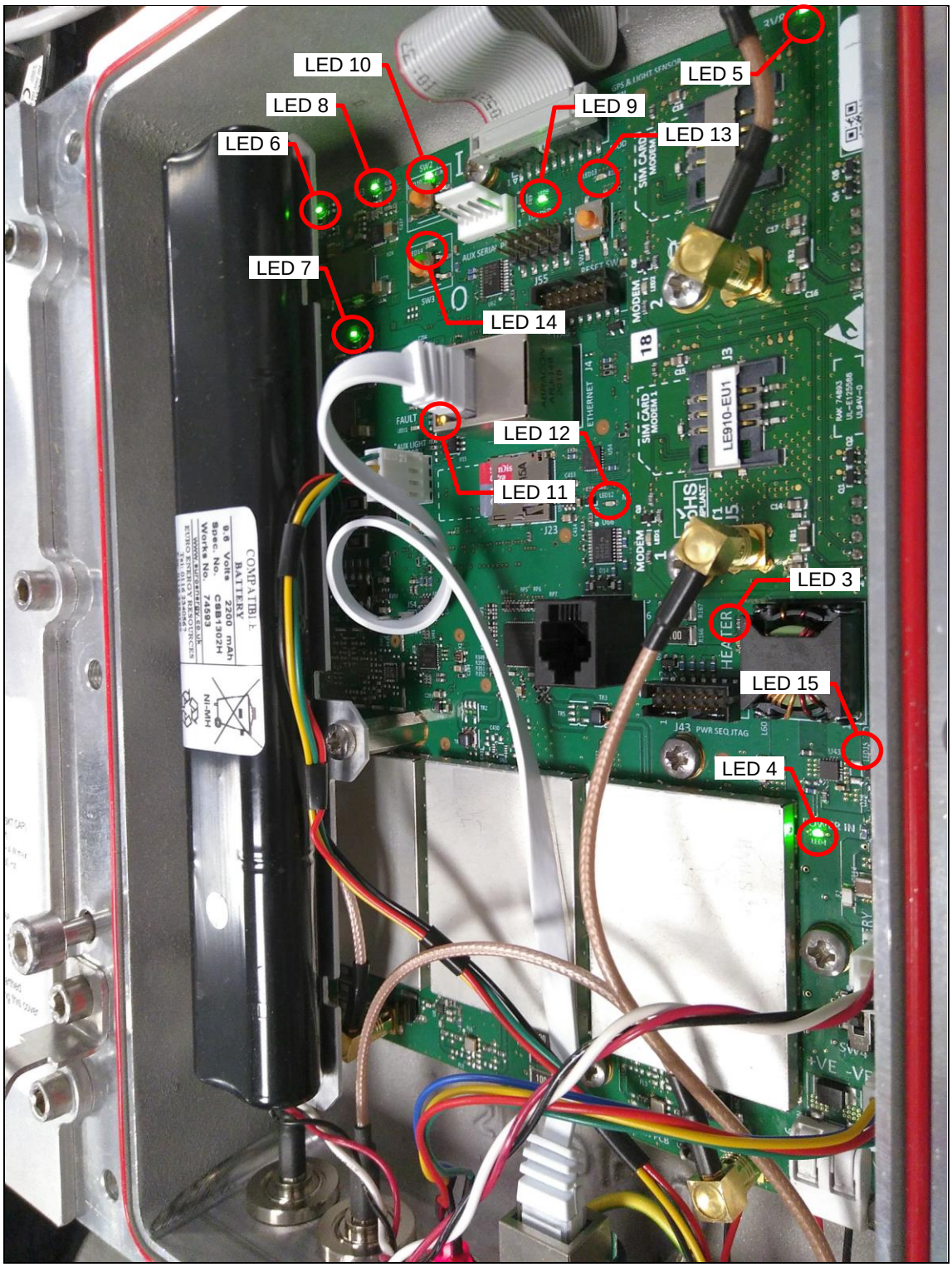
LED1		Status of modem 1
LED2		Status of modem 2



Backhaul/Cellular Board LEDs

10.3 Main Board LEDs

LED3		PCB heater on
LED4		Main supply present *(12V input from PSU)*
LED5		Backhaul module power supply good *(3.8V)*
LED6		PicoZed board power supply good *(5V)*
LED7		Radio power supply good *(6V)*
LED8		PicoZed I/O power supply good *(3.3V)*
LED9		PicoZed FPGA configured
LED10		Indicates that BS4 has successfully booted and system software is now running
LED11		Reserved/Fault *(same as red LED4 on GPS board)*
LED12		Modem 1 basic internet connectivity established *(same as blue LED3 on GPS board)*
LED13		Modem 2 basic internet connectivity established *(same as blue LED3 on GPS board)*
LED14		PicoZed suspended
LED15		Battery charging



Main Board LEDs